SECURITY MARKET TIMING AND EFFECTS OF CREDIT RATING AND CORPORATE GOVERNANCE ON CAPITAL STRUCTURE OF UK FIRMS

by

XIN QIAN

A thesis submitted to the University of Birmingham for the degree of DOCTOR OF PHILOSOPHY

Birmingham Business School
College of Social Sciences
University of Birmingham
September 2014

Abstract

This thesis investigates into the capital structure of public companies in the UK. It consists of two empirical chapters. The first chapter extends market timing theory of capital structure as first proposed by Baker and Wurgler (2002) by looking at the effects of several market timing variables on the corporate financing decisions in the UK. The second study examines the effects of credit rating and corporate governance on capital structure. The sample period covers the most recent seven years. Also, I divide the whole sample period into two periods that are before and during the financial crisis in 2008, to control for the potential effects of financial crisis on the empirical relationships that are investigated in this study.

Based on the capital structure theories, I find mixed evidences that support and different from the theories, and I observe the influences of financial crisis on the research issues that I aim to investigate, which shows the effect of financial crisis can be a real consideration on the capital structure of UK companies.

Acknowledgement

I would like to express my sincere appreciation to my first supervisor, Dr. Abimbola Adedeji, for his patient guidance, supervision and continuous encouragement during the completion of my PhD thesis, without his encouragement, I would not be much confident to finish my thesis. I would like to express my sincere gratitude to my second supervisor, Mr. Kean Ow Yong and academic staffs from Department of Accounting and Finance for their useful comments given me during the completion of my PhD thesis.

I am grateful to doctoral research administrators Ms. Marleen Vanstockem and Ms. Beverley Slater-Harris for their hard work and administrative support.

I am thankful to my parents, for their invaluable understanding and encouragement during my PhD study, I would not be able to complete my PhD thesis without their support.

Table of Contents

CHAPTER 1 INTRODUCTION OF THE THESIS 1

1.1 THEORETICAL BACKGROUND 1

1.1.1 Modigliani and Miller 1

1.1.2 Trade-off Theory 2

1.1.3 Pecking Order Theory 3

1.1.4 Market Timing Theory 4

1.1.5 Agency Theory 4

1.2 GAPS IN THE LITERATURE 6

1.3 MAIN FINDINGS AND CONTRIBUTIONS 9

1.4 ORGANISATION OF THE THESIS 19

CHAPTER 2 SECURITY ISSUANCE AND MARKET TIMING 20

2.1 INTRODUCTION 20

2.2 LITERATURE REVIEW 23

2.2.1 North America 25

2.2.2 Other Part of the World Excluding the United Kingdom 31

2.2.3 United Kingdom 33

2.3 HYPOTHESES 35

2.3.1 Stock Return 35

2.3.2 Market Valuation 41

2.3.3 Information Asymmetry 49

2.3.4 Investment Opportunity 60

2.3.5 Credit Rating 66

2.4 DATA AND METHODOLOGY 70

2.4.1 Data and Variable 70
2.4.2 Dependent Variable 74
2.4.3 Control Variables 76
2.4.4 Summary Statistics 81
2.4.5 Model Specification 84
2.5 RESULTS AND DISCUSSIONS 85
2.5.1 Univariate Results 85
2.5.2 Correlation Analysis 91
2.5.3 Logistic Analysis on Net Equity or Debt Issues 95
2.5.4 Logistic Analysis on Deals Information 106
2.6 CONCLUSIONS AND RECOMMENDATIONS 114
CHAPTER 3 EFFECTS OF CREDIT RATING AND CORPORATE GOVERNANCE ON CAPITAL STRUCTURE 118
3.1 INTRODUCTION 118
3.2 LITERATURE REVIEW AND HYPOTHESES 132
3.2.1 Capital Structure and Credit Rating 141
3.2.2 Capital Structure and Credit Quality 145
3.2.3 Capital Structure and Corporate Governance Index 152
3.2.4 Capital Structure and Managerial Ownership 162
3.2.5 Capital Structure and Substantial Shareholdings 163
3.2.6 Effect of Managerial Ownership on Capital Structure and Substantial Shareholdings 165
3.2.7 Effect of Substantial Shareholdings on Capital Structure and Managerial Ownership 166
3.3 DATA AND METHODOLOGY 167
3.3.1 Data and Variable 167

3.3.2 Control Variables 170
3.3.3 Summary Statistics 175
3.3.4 Model Specification 180
3.3.4.1 Effects of Credit Rating and Corporate Governance on Capital Structure 180
3.3.4.2 Effects Prior and During the Financial Crisis 183
3.3.4.3 Effects of Credit Quality and Corporate Governance on Capital Structure 185
3.3.4.4 Effects Prior and During the Financial Crisis 188
3.4 RESULTS AND DISCUSSIONS 190
3.4.1 Effects of Credit Rating and Corporate Governance on Capital Structure 190
3.4.1.1 Univariate Results 190
3.4.1.2 Multivariate Results 196
3.4.2 Effects of Credit Quality and Corporate Governance on Capital Structure 212
3.4.2.1 Univariate Results 212
3.4.2.2 Multivariate Results 217
3.4.2.3 Dynamic Model 225
3.4.3 Effect of High Level of Managerial Ownership on Capital Structure 235
3.4.4 Effect of Managerial Ownership on Capital Structure and Substantial Shareholdings 239
3.4.5 Effect of Substantial Shareholdings on Capital Structure and Managerial Ownership 244
3.5 CONCLUSIONS AND RECOMMENDATIONS 246

CHAPTER 4 CONCLUSIONS AND FUTURE RESEARCH 252

4.1 CONCLUSIONS 252

4.2 LIMITATION AND FUTURE RESEARCH 258

REFERENCES 260

List of Tables

Table 2.1 Variable Definitions 73
Table 2.2 Summary Statistics 83
Table 2.3 Wilcoxon-Mann-Whitney Test for Dataset 1 86
Table 2.4 Wilcoxon-Mann-Whitney Test for Dataset 2 89
Table 2.5 Correlation Matrix of Independent Variables 93
Table 2.6 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Index 96
Table 2.7 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Characteristics 100
Table 2.8 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Index for the Periods of 2005-2007 and 2008-2011 102
Table 2.9 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Characteristics for the Periods of 2005-2007 and 2008-2011 105
Table 2.10 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Index 107
Table 2.11 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Characteristics 109
Table 2.12 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Index for the Periods of 2005-2007 and 2008-2011 111
Table 2.13 Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Characteristics for the Periods of 2005-2007 and 2008-2011 113
Table 3.1 Variable Definitions 169

Table 3.2 Sample Distribution 177
Table 3.3 Summary Statistics 178
Table 3.4 Wilcoxon-Mann-Whitney Test for Rated Firms and Unrated Firms 191
Table 3.5 Regression Results for Effects of Credit Rating and Corporate Governance on Capital Structure with Total Debt Ratio 197
Table 3.6 Regression Results for Effects of Credit Rating and Corporate Governance on Capital Structure with Long-Term Debt Ratio 201
Table 3.7 Regression Results for Effects of Investment Grade Rating and Corporate Governance on Capital Structure with Total Debt Ratio 205
Table 3.8 Regression Results for Effects of Investment Grade Rating and Corporate Governance on Capital Structure with Long-Term Debt Ratio 207
Table 3.9 Regression Results for Effects of Speculative Grade Rating and Corporate Governance on Capital Structure with Total Debt Ratio 209
Table 3.10 Regression Results for Effects of Speculative Grade Rating and Corporate Governance on Capital Structure with Long-Term Debt Ratio 211
Table 3.11 Wilcoxon-Mann-Whitney Test for Investment Grade Firms and Speculative Grade Firms 213
Table 3.12 Regression Results for Effects of Credit Quality and Corporate Governance on Capital Structure with Total Debt Ratio 219
Table 3.13 Regression Results for Effects of Credit Quality and Corporate Governance on Capital Structure with Long-Term Debt Ratio 223
Table 3.14 GMM Results for Capital Structure and Credit Quality with Total Debt Ratio 227
Table 3.15 GMM Results for Capital Structure and Credit Quality with Long-Term Debt Ratio 234
Table 3.16 Regression Results for Effect of High Level of Managerial Ownership on Capital Structure 236

Table 3.17 Regression Results for Effect of Managerial Ownership (DML) on Relation between Capital Structure and Substantial Shareholdings 240
Table 3.18 Regression Results for Effect of Managerial Ownership (DMS) on Relation between Capital Structure and Substantial Shareholdings 242
Table 3.19 Regression Results for Effect of Substantial Shareholdings on Relation between Capital Structure and Managerial Ownership 245

Chapter 1

Introduction of the Thesis

1.1 Theoretical Background

1.1.1 Modigliani and Miller

The modern theory of capital structure starts with Modigliani and Miller (1958), who argue that capital structure is irrelevant with firm valuation. The MM model is established based on a number of critical assumptions, such as a perfect and efficient capital market in absence of taxes, bankruptcy costs, agency costs, and all participants hold equal amounts of information of the company, it is also known as capital structure irrelevance principle. However, in real world, one or more of the assumptions will be violated, and therefore, the main contribution of Modigliani and Miller theory of capital structure suggests that how the firm is financed is important and identifies the determinants that may affect the capital structure of firm, which points out that capital structure is important and relevant to firm valuation. Subsequently, most of the previous studies on capital structure focuses on how the violations of each of the assumptions determining the capital structure of firm and to what extent they determine by adding various imperfections such as taxes, costs of bankruptcy and agency costs. Therefore, the main theories of capital structure has been developed thereafter, namely trade-off theory, pecking order theory, market timing theory and agency theory, which will be discussed in the following sections.

1.1.2 Trade-off Theory

The trade-off theory of capital structure suggests that the corporate financing decisions of firm move its capital structure towards the optimal level by trade-off between the marginal costs and marginal benefits of corporate debts. The costs of debts include the bankruptcy costs and agency costs, while the benefits include the debt tax shields and reduction of free cash flow problem. Trade-off theory shows that the firm value changes as a function of corporate debt. At the beginning the firm value increases when debt increases, and as the taxes on interest payment is deductible, which increases the after tax return of the shareholders and debtholders. However, at lower level of debt, agency problem could occur, as too much equity would cause free cash flow problem and conflict of interests between managers and shareholders (Jensen and Meckling, 1976; Jensen, 1986), the managers have more discretion over the free cash flow of company and invest in non-profitable projects and other managerial consumption of perquisites to the detriments of external shareholders, which indicates that more debt is needed because interest payments on debt obligation reduce the free cash flow available to consume by corporate managers. On the other hand, as debt increases, firms will experience higher costs of financial distress as well as agency costs, such as underinvestment problem (Myers, 1977) because of loss of valuable investment opportunities because of greater risks of bankruptcy by taking more debt, and asset substitution problem (Jensen and Meckling, 1976) when the managers invest in high-risk projects instead of low-risk projects and by which shift the risks from shareholders to debtholders, which increases agency costs and bankruptcy risks simultaneously. Therefore, high level of debt will conversely decrease the after tax return to shareholders as well as firm value.

The trade-off theory is developed by relaxing several different assumptions of the irrelevance

proposition of MM model, such as bankruptcy costs and agency costs, and however, it keeps other assumptions such as efficient capital markets and information asymmetry. While the increases in tax benefits suggest more debt and the increases in bankruptcy costs suggests less debt, the increase in agency costs can suggests more or less debt. The main conclusion of trade-off theory suggests that the value of a levered firm is equal to the value of an unlevered counterpart plus the present value of tax benefits in perpetuity less the expected costs of financial distress.

1.1.3 Pecking Order Theory

The pecking order theory proposes that firms tend to finance themselves first with retained earnings, second with debt and third with equity (Myers, 1984). Myers and Majluf (1984) argue that there is information asymmetry between managers and outside investors, managers know more about firm than the outside investors, and therefore, when the managers choose to issue equity, investors would perceive that the firm is overvalued and managers want to issue overvalued equity and exploit the overvaluation, and subsequently, investors would place a lower value automatically on the equity. The costs of equity issuance are expensive in terms of large amounts of transaction costs and information costs, and managers tend to avoid the costs of equity issuance whenever possible, and hence, Myers (1984) and Myers and Majluf (1984) suggest that managers will follow a pecking order and use their retained earnings to finance their projects first, second with debt, and use equity only as last resort of finance. Also, when there is a lack of investment opportunities, firms tend to build up their financial slacks by saving their earnings to avoid the future needs of raising external capital.

1.1.4 Market Timing Theory

The market timing theory of capital structure argues that firms tend to time the equity market while making their capital structure decisions, as Baker and Wurgler (2002, p.3) write, "Capital structure is the cumulative outcome of attempts to time the equity market". As Baker and Wurgler (2002) point out, there are two versions of market timing theory, the first version of market timing theory is a dynamic pecking order theory with rational managers and investors with time-varying adverse selection costs, and Korajczyk et al (1991) report that firms tend to issue equity following the release of new information to reduce the information asymmetry between managers and shareholders and the information costs of new equity issues. The second version is based on irrational managers and investors with time-varying managerial perception of equity mispricing, Baker and Wurgler (2002) argue that managers tend to issue equity when they believe its cost is irrationally low and repurchase equity when they believe its cost is irrationally high. Baker and Wurgler (2002) find an inverse association between debt ratio and market to book ratio as a proxy for market valuation of equity, which shows that firms are more likely to issue equity when the managers perceive that the market valuations of equity are high, and firms are more likely to repurchase equity when the market valuations of equity are low. Baker and Wurgler (2002) state that the explanatory power of market timing theory of capital structure is very substantial and the effect of historical market to book ratio on the capital structure of firms is persistent for over at least a decade.

1.1.5 Agency Theory

The agency theory of capital structure suggests that the capital structure of firm is determined by the agency costs as a result of principal-agent conflict between managers and shareholders. The agency problem initially occurs due to the separation of ownership and control, although

the ultimate goal of the managers is to maximise the wealth of external shareholders in corporate finance, managers and shareholders often have different interests as managers often act to serve their personal interests to the detriments of external shareholders, such as free cash flow problem and managerial excessive consumption of perquisites, while the shareholders are not able to verify what the managers are doing due to the information asymmetry between managers and shareholders. Therefore, in order to control for the conflict of interests between managers and shareholders and alleviate the agency costs, good corporate governance practice is needed so that the companies could sustain from the agency problem, reduce the agency costs and protect the wealth of external shareholders. As firms need to finance their project with external fund when they run out of cash, agency costs are strongly associated with the costs of external financing (Lasfer, 1995; Brailsford et al, 2002; Florackis and Ozkan, 2009; Mande et al, 2012). Florackis and Ozkan (2009) point out that strong corporate governance structure can help the companies issue more debt due to the reduction in agency costs. Moreover, Mande et al (2012) report that firms tend to reduce agency costs of external financing before debt and equity issues, and they suggest that firms should aim to improve their corporate governance quality to reduce agency costs before access to the debt and equity markets.

In addition, underinvestment problem arises when shareholders under invest by investing in high-risk projects in exchange of low-risk ones, which would increase shareholders' wealth at the expense of debtholders (Jensen and Meckling, 1976; Myers, 1977; Graham and Harvey, 2001). As high-risk projects generate excess returns that would increase value of shareholders from higher income, debtholders do not necessarily require investment in high-risk assets and they only require steady income to pay off their debt interests, and the underinvestment

problems occur when debtholders are not compensated for taking additional risks. While investment in low-risk assets provide more security to debtholders, but not tend to generate excess return for shareholders, shareholders reject the low-risk projects and invest in high-risk ones in order to increase their wealth to the detriments of external debtholders.

Furthermore, asset substitution is another type of agency problem between shareholders and debtholders (Jensen and Meckling, 1976; Myers, 1977). Specifically, asset substitution occurs when the firms substitute low-risk assets for high-risk investment, which transfers the values from debtholders to shareholders of the firms. Similarly to underinvestment, asset substitution of high-risk projects for low-risk ones adds more risks to debtholders without compensation for undertaking additional risks. Nevertheless, higher risks are often associated with higher income, which would only benefit shareholders, whereas debtholders only receive a fixed proportion of cash flows and are not compensated for higher risks that will likely to increase the probability of default on debt.

1.2 Gaps in the Literature

With respect to previous empirical studies, most of the studies on the relationship between security issuance and market timing are based in the US, seldom in the UK. Marsh (1982) investigates the effect of market timing on debt and equity issues in the UK, and however, more than thirty years have passed and the economic conditions in the UK has changed dramatically, the study of Marsh (1982) may not help to fully understand the corporate financing decisions in the institutional environment nowadays. Marsh (1982) develops a descriptive model in explaining the corporate financing decisions and considers the effects of market timing variables including debt and equity market conditions and stock return, but it

does not consider the other factors as suggested by previous studies (Baker and Wurgler, 2000; O'Brien et al, 2007; Autore and Kovacs, 2010; Kisgen, 2006; Dittmar and Thakor, 2007; Gatchev et al, 2009), including equity market valuation, information asymmetry, investment opportunities and credit rating. Moreover, Brounen et al (2006) and Hussain (2011) contend that stock return and equity mispricing are important factors determining debt and equity issuance decisions in the UK, whereas they do not examine the other market timing factors. Furthermore, none of the previous UK studies examines the effect of market timing on dual issues, as dual issues are important event that may determine the capital structure of firms.

Since the emergence of credit rating agencies, the relationship between capital structure and credit rating has merely been addressed. However, this topic has become increasingly popular in recent years. The recent literatures examine the effects of levels and changes in credit rating on capital structure of firms (Kisgen, 2006; Mittoo and Zhang, 2010; Michelsen and Klein, 2011). There are recent UK studies examined the relationship between capital structure and credit rating (Judge and Mateus, 2009; Judge and Korzhenitskaya, 2011; Naeem, 2012). Judge and Mateus (2009) and Judge and Korzhenitskaya (2011) examine whether the bond market access, as proxied by having credit rating, would affect the capital structure of the UK firms, and they confirm that the firms with bond market access have significantly more leverage on their capital structure than the firms without the access. Moreover, they look at the effect of financial crisis on the relationship between capital structure and credit rating, and argue that the leverage difference between rated and unrated firms is greater during the financial crisis when the credit market is tightening, and becomes looser when the credit market is loosening. Importantly, they point out that firms that are highly dependent on bank loans would find themselves severely constrained during the financial crisis because of the shortage in bank

loan supply, whereas firms with credit ratings are more able to source their external funding during the financial crisis. However, they do not attempt to investigate the effect of different levels of credit rating on capital structure of firms.

Moreover, Naeem (2012) examines the effect of credit rating levels on the capital structure of firms. She finds that the rated firms are significantly more levered than unrated firms, and the high rated and low rated firms tend to maintain lower debt ratio than the mid rated firms, as high rated and low rated firms are more concerned about their credit ratings transferring into lower leverage. However, Naeem (2012) does not consider the potential effects of financial crisis on the relationship between capital structure and credit rating.

Previous UK studies have not considered the effects of two main rating categories that are investment grade rating and speculative grade rating on capital structure of the UK firms. Most of the debt contracts such as commercial paper and Eurobond would require firms to obtain investment grade ratings, and firms with speculative grade ratings may not be able to borrow at favourable terms compared to the firms with investment grade ratings. None of the UK studies attempt to investigate the differences in capital structure between investment grade firms and unrated firms, and between speculative grade firms and unrated firms. As the effects of investment grade rating and speculative grade rating on capital structure of firms may be different and potentially offset each other if we combine both investment grade firms and speculative grade firms as a single group of rated firms, it can be problematic when examining the leverage difference between rated firms and unrated firms.

Due to the separation between ownership and control, the principal-agent problem between

corporate managers and external shareholders has received numerous debates. There have been increasingly more and more studies on the relationship between capital structure and corporate governance. Recent studies carry out investigations by constructing corporate governance index as a proxy for overall corporate governance quality of firms (Gompers et al 2003; Jiraporn and Gleason, 2007; Bebchuk et al, 2008; Jiraporn et al, 2012; Mande et al, 2012), and however, none of the studies investigates the effect of corporate governance index on capital structure of the UK firms. Previous UK studies examine the corporate governance characteristics independently to explain their effects on capital structure, however, as Mande et al (2012) suggests, an integrated corporate governance index gives better explanation rather than a collection of individual corporate governance characteristics. In addition, seldom studies examine the effect of financial crisis on the relationship between capital structure and corporate governance.

1.3 Main Findings and Contributions

The findings of the thesis can be summarized as follows. The first empirical chapter examines the effects of market timing variables on security issuance decisions in the UK. In particular, I investigate the effects of stock return, industry-adjusted market to book ratio, information asymmetry, investment opportunities and credit rating on corporate financing choices of firms, including debt issues, equity issues and dual issues. The sample firms are based on the UK public firms over the sample period of 2005 to 2011. The empirical evidences are estimated by logistic regressions and I report the marginal effects to interpret the economic significance of the results. The outliers are controlled for across the datasets, and the industry and time dummies are incorporated in all models. I divide the sample period into two sub periods, which are 2005 to 2007 and 2008 to 2011, to test for the relationships before and during the

financial crisis.

I find that firms have higher probability to issue equity when they experience negative stock returns in the year prior to the equity issuance, and also, I find that firms are more likely to issue the undervalued equity, which are significantly different from the previous findings that firms issue equity after positive stock returns and that firms tend to issue overvalued equity (Loughran and Ritter, 1995; Graham and Harvey, 2001; Baker and Wurgler, 2000; O'Brien et al, 2007). The empirical results imply that firms tend to issue equity under financial distress. Having considered the effect of financial crisis, I find that the negative impact of stock return and equity market valuation on the probability of debt versus equity issues are prominently driven by the period during the financial crisis, which provide new insights that firms tend to issue equity under financial distress over the sample period of investigation. In addition, I find the average amount of equity issued per year during the financial crisis is significantly greater than the average amount before the financial crisis, which increases from approximately 3.3 equity issues per year between 2005 and 2007 to 9.5 equity issues per year between 2008 and 2011, this gives supports that firms tend to issue equity during the period of financial distress.

In addition, I use firm size and corporate governance index or characteristics as inverse proxies for information asymmetry, I find that firms with higher levels of information asymmetry have higher probability of equity issues for the period before the financial crisis. In addition, I find that the information asymmetry is positively associated with the probability of debt versus dual issues between 2005 and 2011, as dual issues share the characteristics of both debt and equity issues and they are less leverage-increasing than debt issues, one could argue that the positive relationship between information asymmetry and probability of debt

versus dual issues may indicate that firms are more likely to issue equity when they have high levels of information asymmetry. The results are in line with pecking order theory that firms issue equity under financial distress, and equity issuance is only considered as a last resort of financing due to the highest costs of information asymmetry. Nevertheless, the results are inconsistent with the previous findings that firms are more likely to issue equity when the levels of information asymmetry are lower compared to the recent past (Dittmar and Thakor, 2007; Autore and Kovacs, 2010). Moreover, I find that profitability is negatively associated with the probability of debt versus equity issuance, which shows that firms prefer debt to equity due to the information costs as a result of information asymmetry between managers and shareholders, this supports the pecking order theory that firms prefer to finance their themselves first with retained earnings, second with debt and third with equity.

As the stringent bankruptcy code in the UK offers strong creditor protection, the UK firms tend to finance their corporate investment with short-term bank loans and equity rather than long-term debts, because creditors have the rights to liquidate the firms if the firms do not pay back their debt interests promptly, while short-term bank loans are more flexible in terms of debt negotiation between lenders and firms. However, the short-term bank loans have reduced significantly during the financial crisis, and most of the firms have been affected by the financial crisis and become financially distressed, it is highly unlikely for these firms to issue short-term bank loans. Therefore, instead, the financial distressed firms choose to issue equity to compensate for the contraction in short-term debt financing. As Dissanaike et al (2014) point out, although equity issues are usually seen as a negative signal that firms exploit the equity overvaluation, nonetheless, equity issues may be seen as a positive signal, as the investors might be relieved to see that equity issues could save the firms from bankruptcy.

However, contrary to the pecking order theory, I find that equity is not typical issued by financial distressed firms. Specifically, the probabilities of debt versus equity issues and debt versus dual issues increase with increases in investment opportunities, and the probability of dual versus equity issues decreases with increases in investment opportunities, which are proxied by capital expenditure and research and development expense as indicators of investments in tangible assets and growth opportunities respectively. The results implies that firms tend to issue equity or both of debt and equity to finance their investment opportunities, and equity is not issued by firms under financial distress. More importantly, this study provides new insights that issue size may be an important consideration for the firms while raising external financing, which has not been documented in any of the previous UK studies. Alternatively, the relationship between security issuance and investment opportunities can be explained by the underinvestment problem, as firms with higher investment opportunities are likely to maintain lower debt ratios as increased debt levels would let firms pass up valuable investment opportunities due to increased bankruptcy risks.

Furthermore, this is the first study tests whether credit rating has significant influence on the security issuance decisions in the UK. However, I do not find that the probability of security issues is significantly associated with corporate credit rating. This may give supports that the UK firms do not have propensity to borrow from the long-term debt markets due to stronger credit protection compared to the US markets. Therefore, the UK firms prefer to finance their projects with short-term bank loans or equity rather than long-term debts, the bond market access does not significantly affect the firms' corporate financing decisions, which leads to an insignificant relationship between probability of security issuance and credit rating.

Finally, target capital structure is measured by historical and industry average debt ratio, I find that over-levered firms tend to issue equity and under-levered firms tend to issue debt, which is in line with trade-off theory but inconsistent with pecking order theory. The trade-off theory of capital structure suggests that firms have target capital structure and tend to maintain their capital structure close to its target by issuing debt and equity, as costs of deviating from target capital structure can be expensive. On the other hand, pecking order theory does not support trade-off theory, and it implicitly suggests that firms do not have target capital structure and costs of deviating from target capital structure are not significantly costly.

The second empirical chapter aims to investigate the effects of credit rating and corporate governance on capital structure of UK firms. I implement two distinguished measures as proxies for credit rating, which are bond market access and credit rating level. The corporate governance is measured by corporate governance index, individual corporate governance characteristics and ownership structure. I use two measures of dependent variable, which are total debt ratio and long-term debt ratio. The sample firms are based on the UK public firms over the period of 2005 to 2011. The empirical evidences are estimated by panel regressions, and also, in order to control for the endogenous relationship between dependent and independent variables, I conduct Arellano-Bond Generalized Method of Moments estimation. The outliers are controlled for across the datasets, and the industry and time dummies are incorporated in all models, except in GMM models, the industry dummies are dropped. In order to control for the time-invariant industry-specific effects, all the variables in GMM models are in first differenced terms. I divide the sample period into two sub periods, which are 2005 to 2007 and 2008 to 2011, to test for the relationships before and during the financial

crisis.

I find the firms with credit ratings are more levered than the firms without ratings, because of the credit ratings give the firms permission to borrow from the long-term public debt market, which increases the supply of debt capital. Long-term debts have lower costs of borrowing, larger size of issue, longer maturity, less restrictive covenants and require less safe assets compared to short-term bank loans (Rajan and Winton, 1995; Faulkender and Petersen, 2005). Also, Mittoo and Zhang (2010) and van Binsbergen and Graham (2011) state that long-term debts offer a cheaper source of capital because of monitoring costs and reduced information asymmetry between managers and outside investors.

More importantly, this study contributes to the academic literatures and generates insights into the interactions between investment grade ratings and speculative grade ratings in explaining the positive relationship between capital structure and credit rating. As discussed earlier, the effects of investment grade ratings and speculative grade ratings on leverage may offset each other in examining the effect of credit rating on capital structure of firms, this may induce potential problems if we directly examine the relationship between capital structure and credit rating, for example, reduced economic significance of positive relationship between capital structure and credit rating.

This study provides supportive evidences that the effects of investment grade ratings and speculative grade ratings on leverage offset each other, which has not been documented in prior research. Specifically, investment grade firms have higher long-term debt ratio than unrated firms, and speculative grade firms have lower long-term debt ratio than unrated firms.

As most of the rated firms in the UK have investment grade ratings, firms with speculative grade ratings may have significantly higher credit risk and costs of borrowing than investment grade firms as well as unrated firms. As the bankruptcy law in the UK is more stringent in terms of creditor protection compared to the US market, speculative grade firms face higher risk of liquidation when they miss the debt payments. As a result, speculative firms tend to have lower long-term debt ratio and prefer to finance themselves with short-term bank loans or equity.

Nevertheless, speculative grade firms in the US might play a different role. As the bankruptcy law in the US is more flexible than the UK market, speculative grade firms may use their credit ratings and issue long-term debts, because long-term debts tend to have lower costs of borrowing, larger size of issue and longer maturity than short-term bank loans (Rajan and Winton, 1995; Faulkender and Petersen, 2005). This has also been supported by the previous literatures. For example, Mittoo and Zhang (2010) find that speculative grade firms tend to be more levered than investment grade firms, they argue that investment grade firms tend to maintain their target minimum levels of credit ratings as their debt contracts are conditional upon minimum levels of credit ratings, and therefore, investment grade firms tend to maintain lower than optimal leverage (Graham and Harvey, 2001; Kisgen, 2007; Kisgen, 2009). On the other hand, speculative grade firms issue long-term debts to enhance their financial flexibility and take the advantages of long-term debt issues compared to short-term bank loans, and thus, speculative grade firms tend to be more levered than investment grade firms. Although Mittoo and Zhang (2010) find that rated firms are more levered than unrated firms, they could not determine whether this relationship is mainly driven by investment grade firms or speculative grade firms, and whether speculative grade firms are more levered than unrated firms or

investment grade firms are less levered than unrated firms. This study fulfil the gap in prior literatures and provide evidences that the positive relationship between capital structure and credit rating in the UK is predominantly driven by the positive effect of investment grade rating on long-term debt ratio of firms.

Moreover, I confirm that investment grade firms have higher debt ratio than speculative grade firms. Interestingly, I find that the long-term leverage difference between investment grade firms and speculative grade firms declines during the financial crisis, which is another new finding. Due to the severe credit market condition and constrained supply of short-term debts during the financial crisis, creditors may demand stricter terms in long-term debt issuance, investment grade firms tend to reduce their long-term leverage to ensure their access to bond market are not affected by the financial crisis. On the other hand, speculative grade firms tend to be increasingly more distressed and they may not able to raise short-term bank loans, and therefore, they may use their credit ratings and issue long-term high-yield bonds in order to increase their financial flexibility and compensate for the reduction in short-term debts during the financial crisis.

With respect to corporate governance mechanisms, this is the first UK study examining the effect of overall corporate governance quality, as proxied by corporate governance index, on the capital structure of UK firms. In addition, this study generates new insights into the effect of financial crisis on the relationship between capital structure and corporate governance mechanisms. I find that the overall corporate governance quality is negatively related to total debt ratio, this implies that firms substitute debt for weak corporate governance quality to limit the managerial discretion in serving their personal interests to the detriments of external

shareholders, such as overpayment of poor managerial performance and misuse of managerial power for pecuniary. More importantly, the negative relationship between capital structure and corporate governance index becomes stronger during the financial crisis. Due to the increased costs of external debt and costs of financial distress, firms with good governance quality tend to further reduce their debt financing, or their access to the external debt markets are affected by the financial crisis, which leads to a lower debt ratio. However, firms with weak governance quality tend to increase their debt levels in exchange for weak governance quality to mitigate the conflict of interests between managers and shareholders and reduce the agency costs, especially during the period of financial distress.

The corporate governance index help to interpret the overall corporate governance quality of firms, however, one potential drawback is that it does not consider the proportional effects of individual corporate governance characteristics in determining the capital structure of firms. Therefore, I also examine that effects of individual corporate governance characteristics on capital structure. I find board size is positively associated with debt ratio, and proportion of independent non-executive directors and audit committee members on board, as well as audit committee independence are negatively associated with debt ratio, which provide supports that firms with better governance quality tend to have lower debt ratio. Moreover, I find that the negative influence of audit committee independence becomes greater during the financial crisis, which is consistent with the previous findings.

In line with the hypotheses, I find that managerial ownership and substantial shareholdings have negative effects on capital structure of firms. The incentives of corporate managers and external shareholders tend to be aligned together as managerial share ownership increases,

and managers are less likely to pursue their political interests, which would alleviate the agency conflicts between managers and shareholders and reduce the agency costs, and hence, firms have lower needs to use debt as external corporate governance mechanism in reducing the agency costs, leading to a lower debt ratio. Similarly, firms have higher substantial shareholdings tend to have better corporate governance and lower agency costs, as substantial shareholders often act as safeguard for the interests of small and medium shareholders, and therefore, better governed firms are likely to maintain lower debt ratios. Interestingly, as the first study generates insights into the effect of financial crisis on the relationship between capital structure and ownership structure, I find that the negative effects of managerial ownership and substantial shareholdings on capital structure are weakened significantly during the financial crisis. Specifically, the economic significance of the relationship between capital structure and managerial ownership is reduced, and the negative relationship between capital structure and substantial shareholdings become positive. The results imply that firms with better corporate governance have lower agency costs and lower costs of financial distress than firms with weaker corporate governance, and better governed firms are able to sustain higher debt ratios during the financial crisis, which results in a weakened association between capital structure and ownership structure.

Finally, I find that the presence of high level of managerial ownership weakens the positive relationship between capital structure and substantial shareholdings during the financial crisis. At low levels of managerial ownership, the monitoring of substantial shareholders results in a positive relationship between capital structure and substantial shareholdings. Nevertheless, at high levels of managerial ownership, the managers become entrenched and compete with the monitoring from substantial shareholders that results in a weakened relationship between

capital structure and substantial shareholdings.

1.4 Organisation of the Thesis

The rest of the thesis is organised as follows. Chapter 2 examines the relationship between security issuance and market timing. Chapter 3 investigates the effects of credit rating and corporate governance on capital structure of UK firms. Chapter 4 summarizes and concludes the thesis, makes suggestions to the policy makers and points the avenue for future research.

Chapter 2

Security Issuance and Market Timing

2.1 Introduction

[1]Since the emergence of first public limited company, firms tend to be more diversified, and the global economies are mainly driven by the public limited companies, which are among the largest companies in the world. Public limited companies have been recognised as one of the greatest innovations, equity issuance provides chances for the firms to raise external capital more quickly and larger in issue size than debt issuance, which provide opportunities for the firms to fund their growth.

Capital structure changes over time and across firms. In order to meet the corporate financing needs, firms raise their funding internally and externally, such as retained earnings, debt and equity. Pecking order theory suggests that equity issues tend to be the most expensive form of financing because of the costs of information asymmetry. As managers often have information advantages over external shareholders, the shareholders often consider the equity issue as a bad signal that the managers attempt to issue the overvalued shares at the costs of uninformed investors. To compensate for the uninformed outside investors, negative announcement effects are often associated with seasoned equity issues. In addition to the information costs, the out of pocket transaction costs for equity issuance that are paid to underwriters are expensive. Therefore, the non-constrained firms prefer to finance themselves with debt rather than equity,

[1] I was invited and presented "Security Issuance and Market Timing" in the Annual International Conference in Finance in Athens, Greece in 2011 and Money, Macro and Finance Conference in Dublin, Ireland in 2012, I also presented this study in the Doctoral Research Seminar in Birmingham Business School in Birmingham, UK.

and the short-term debt issues are the most favourable source of external financing as it has the least amount of costs associated with short-term debt issues.

The other prominent theory in capital structure literatures is trade-off theory, which suggests that firms have target capital structure in mind and seek ways to minimize the cost of capital and maximise the firm values, and maximisation of the wealth of external shareholders is the ultimate goal of corporate managers. The cost of capital is the proportional cost of financial instruments including cost of debt, cost of equity and cost of preferred stock. Firms minimize their cost of capital and maximise their present value of future expected cash flows and dividends through trade-off between costs and benefits of equity and debt, and after trade-off they will issue either equity or debt, whichever the market condition is more favourable when they need external financing. If the firms have an optimal capital structure in mind, they tend to readjust their capital structures back to their target capital structure when their capital structure deviate from the target levels because of the issuance of new equity or debt.[2]

More importantly, Frank and Goyal (2009) point out that market timing theory has become increasingly popular and theoretical developments may need for it to become an independent theory. Marsh (1982) examines the effects of market timing on choosing between debt and equity for a sample of UK firms over the period of 1959 to 1974, however, thirty six years have passed and the economic environment has changed dramatically, and therefore, the study may not explain the reasons for recent security issuance in the UK. Also, Marsh (1982) examines the effects of debt and equity market conditions on the choice between debt and equity, but he does not take the other market timing variables into consideration, such as the

[2] Prior literature suggests that managers have more discretion to adjust the firms' capital structure by repurchasing debt and equity rather than issuance of new financial instruments (Hovakimian et al, 2004).

effects of information asymmetry, investment opportunities and corporate debt credit rating.

Brounen et al (2006) point out that UK managers attempt to time the debt and equity markets when they need to raise external financing to finance their investment opportunities. They argue that stock return and equity market valuation are the most important factors affecting equity issuance in the UK. Moreover, Hussain (2011) reports that firms have propensity to reduce their cost of capital by actively timing the debt and equity markets, he contends that firms make equity issuance and repurchase decisions primarily based on equity mispricing, and also, he argues that firms have target capital structure and are likely to adjust their capital structure back to the target levels through security issuance in the UK.

This study aims to determine the underlying reasons that affect the corporate financing decisions in the UK. I examine the security issuance in the UK between 2005 and 2011 on a set of independent variables, including stock return, market valuation, information asymmetry, investment opportunities, debt credit rating and firm characteristics, I include the short-term interest rate as a proxy for the short-term debt market condition and the redemption yield as a proxy for the long-term debt market condition. This study generates new insights into the corporate financing decisions in the UK. Specifically, none of the recent UK studies examine the influence of information asymmetry, investment opportunities and credit rating on the corporate financing decisions in the UK. I use the corporate governance quality as measured by corporate governance index and individual corporate governance characteristics as inverse proxy for information asymmetry in addition to firm size. Also, I include two proxies for investment opportunities that are capital expenditure and research and development expense as measures for investment in tangible assets and intangible assets respectively. Furthermore,

firms with bond market access, as measured by credit rating, are more likely to issue long-term corporate debt than firms without access to the bond market, and therefore, I include credit rating to examine its effect on the corporate financing decisions in the UK.

We experienced a global financial crisis that profoundly reshaped the global capital markets, the firms are more likely to become financially constrained than the period before the crisis, while the external financing markets are significantly affected by the financial crisis, as banks act more conservatively in lending to the firms, which leads to a significant reduction in the supply of short-term bank loans. In order to examine for the effects of financial crisis on the relationship between security issuance and market timing determinants, I divide the sample period into two sub periods that are before and during the financial crisis to investigate the changes in the corporate financing decisions of the UK firms.

This study is organised as follows. In the next section, I conduct the literature review. Then, I develop the hypotheses that will be tested in this study. After that, I describe the methodology. Finally, I present the results and conclude the study in the end.

2.2 Literature Review

"A central question in the corporate finance theory is: why and when firms issue equity" (Dittmar and Thakor, 2007, p.1). One current regularity, which can help to explain the issue behaviour that is, firms issue equity when their stock prices are high and overall market condition is good, for example, when equity market rises. The market timing effect is an extremely important consideration for both managers and financial advisers when issuing equity (Marsh, 1982).

Firms issue equity in an attempt to time the equity market, which is generally referred as market timing theory. However, this regularity contradicts with two other traditional theories within the capital structure framework, which are the trade-off theory and pecking order theory (Myers, 1984; Myers and Majluf, 1984). As trade-off theory suggests, firms have a target debt ratio to allow them maximise the firm value by trade-off between the benefits of debt (e.g. debt tax shield) and costs of debt (e.g. costs of financial distress). Nonetheless, this suggests that after recent share price run-up, firms issue debt rather than equity to constantly adjust their capital structure back to an optimal level, which is inconsistent with market timing that firms tend to issue equity after recent share price appreciation. Furthermore, the pecking order theory suggests that firms choose to finance themselves first with retained earnings, second with external debt and third with external equity. Therefore, firms only consider equity issues as the last resort of finance. Nevertheless, in practice, firms frequently issue and repurchase equity, and equity issues are not typically done by firms under financial distress. As Fama and French (2005) claim, during the period of 1993 to 2002, 86% of the sample firms in the US issue equity every year. As Elliott et al (2008, p.175) report, because of the overvaluation of equity, "Successful timing of the equity lowers the firm's cost of equity and benefits current shareholders at the expense of new shareholders." Therefore, to seek out for an explanation of why firms in the UK issue equity, market timing is vital to help us understand the implication behind what happens. In this chapter, I sectionalise the previous findings in the literatures by different geographical regions, including North America, other countries excluding the UK and the UK.

2.2.1 North America

Dittmar and Thakor (2007) list four aspects of market timing effects on why do the US firms issue equity. First, according to the timing hypothesis or equity mispricing, firms issue equity when the managers consider that the equity is overvalued, and repurchase equity when it is undervalued. O'Brien et al (2007) examine how managers swap between equity and debt to exploit mispricing of securities to the benefits of shareholders, they confirm that firms tend to issue equity and use the proceeds to pay their debt when equity is overvalued, and firms tend to issue debt and use the proceeds to repurchase equity when equity is undervalued. In addition, they also consider a case when both equity and debt are undervalued, and they report that firms are more likely to issue equity, which is undervalued, to pay back the undervalued debt, because debt is usually more undervalued than equity in such situation. Second, following time-varying adverse selection, lower information asymmetry normally associates with higher stock price (Lucas and MacDonald, 1990; Choe et al. 1993; Dittmar and Thakor, 2007). Specifically, for firms with high information asymmetry, they tend to gain more by issuing equity after reducing the information asymmetry between managers and outside investors, therefore, these firms are more likely to issue equity when the information asymmetry is lower compared to the recent past (Autore and Kovacs, 2010). Third, based on managerial investment autonomy, Dittmar and Thakor (2007) report that firms tend to issue equity when investors are more prone to agree with managerial investment decisions, and they point out that the high levels of share prices reflect the high levels of agreement among investors. Fourth, in consistent with disagreement-based overpricing, disagreements among the investors about the managerial investment decisions may result in overpricing of shares, which may leads to new share issues by the firms.

Dittmar and Thakor (2007) focus on a number of seasoned equity issues and nonconvertible debt issues by the US firms between 1993 and 2002, and they investigate why the firms issue equity. One of the most important findings is that they predict managers tend to use equity to finance a project when they believe that the investors' views about the future project payoffs are likely to align with themselves, which are positive future payoffs. Thus, the level of agreement of a project between the managers and investors is maximised. Also, they conclude that firms issue equity when the share prices are high, either because there is a chance for exploiting overvaluation, or because the information asymmetry is lower in comparison with the past when the share prices are higher. Furthermore, Dittmar and Thakor (2007) state that having issued equity, firms have a larger increase in investments and, this effect is especially stronger for the firms with higher agreement about the future project returns between the managers and external shareholders. Therefore, for the need of the future investment, firms choose to issue equity to satisfy their capital expenditure. Nevertheless, as points out by Dittmar and Thakor (2007), equity will only be issued while financing a project, however, if firm does not have a project, managers may choose to issue debt rather than equity. As Dittmar and Thakor (2007) suggest that, capital expenditures increased significantly after equity issues, but not after debt issues.

Loughran and Ritter (1995) state that most seasoned equity issues occur after a period of high stock returns. Loughran and Ritter (1995) report that companies conduct initial public offerings and seasoned equity offerings severely underperform, for example, have low annual holding period returns, compared with non-issuing companies for the five years after the issuing date. They find the poor subsequent performance of IPO and SEO issuing firms relative to non-issuing firms is merely due to the effect of long-term stock return reversals.

Loughran and Ritter (1995) point out, when firms sell stock during a period of high level of issuing activities significantly underperform, whereas firms sell stock during low volume period apparently do not underperform. According to the results present by Loughran and Ritter (1995), we can see that a good market condition drive the firms issue overvalued stock, because of the reversals of long-term stock returns, firms significantly underperform for the five years after issuing overvalued stock in a high volume period, the resulting underperformance after issuing equity is also supported by Levis (1993) and Loughran and Ritter (1997).

As one of the most cited papers relating to market timing studies and the first study addressing the marketing timing effect by using market to book ratio as a proxy for firm's market valuation to measure the market timing opportunities as perceived by the managers, based on a number of US firms, Baker and Wurgler (2002) document the relation between the market timing and capital structure and suggest that "capital structure is the cumulative outcome of attempts to time the equity market." Baker and Wurgler (2002, p.3) They argue that there is no optimal level of capital structure as in the trade-off theory, that the firms trade-off between the benefits of debt (debt tax shield) and costs of debt (cost of financial distress), however, they believe firms' capital structure is accumulated by equity market timing. Baker and Wurgler (2002) find that low levered firms tend to raise fund during the periods their market value relative to book value is high, and high levered firms tend to raise fund during the periods their market value relative to book value is low, they point out that the historical market valuations have quite persistent effect on firms' capital structure. They provide two versions of explanations for their findings on equity market timing. First, with rational managers and investors, firms are more likely to issue equity when the adverse

selection is low, as the extent of adverse selection is negatively related to the market to book ratio. Second, the investors are irrational and managers issue equity when they perceive that the equity is overvalued by the investors by utilizing market to book ratio as a proxy for misevaluation. Another explanation of equity market timing, which is not presented in the paper of Baker and Wurgler (2002), that is firms issue equity to finance the growth opportunities rather than debt McConnell and Servaes (1995), as debt may cause the managers pass up the positive net present value projects due to the negative effect of debt on the firm value.

Interestingly, Graham and Harvey (2001) conduct a survey based on 392 CFOs asking about their views in their corporate financing decisions. They find that while issuing debt, firms are mostly concerned with financial flexibility and credit rating, whereas while issuing equity, firms are mostly considered with recent stock price performance and diluted earnings per share. Therefore, firms systematically time the security market in order to seek for the exploitation of equity overvaluation and lower cost of capital for equity and debt. Graham and Harvey (2001) argue that firms issue equity if the stock price has recently risen and issue debt if the debt interest is low. Their findings for equity that equity market price is an important or very important consideration while issuing equity and equity issue is followed by a recent increase in stock price, have been supported by many prior literature in the field of market timing research. (Marsh, 1982; Baker and Wurgler, 2002; Dittmar and Thakor, 2007; Elliott et al., 2008; DeAngelo et al., 2010) The findings on debt issue of Graham and Harvey (2001) have only received some moderate supports from prior literatures. As Graham and Harvey (2001, p.223) write, “executives attempt to time interest rates by issuing debt when they feel that market interest rates are particular low.” While Barry et al. (2008) support this finding

and report that the amount of debt issues is particular higher compared to the equity when interest rates are low compared to the past levels or the recent historical levels of interest rate is low, hence both the levels and changes in the level of interest rate affect the debt issuance decisions of the firms. However, some other studies provide some contradictory results relative to Graham and Harvey (2001) and Barry et al. (2008), Barry et al. (2009) provide a forward looking sense and find some evidences that both the past and future interest rate are associated with debt issuance, for example, managers choose debt now either because the current interest rates are lower than the historical interest rates or because the managers believe that the future interest rates will rise subsequently, Barry et al. (2009) assume that managers may possess some private information on debt not reflected in the debt market prices. However, Barry et al. (2009) find that the managers are lack of timing ability based on the future corporate debt interest rate in the long run. In addition, Butler et al. (2006) report that average managers cannot time the debt market successfully and cannot predict the fluctuations in the future interest rate. The main focus of this thesis is look at why do firms in the UK issue equity relative to debt, thus, we will focus on the factors that will affect the equity issuance decisions of the UK firms.

DeAngelo et al (2010) assess the effect of market timing opportunities and corporate lifecycles on the firms while conducting seasoned equity offerings based on a sample of the US listed companies. Among the equity issuers, DeAngelo et al (2010) find that the probability of conducting seasoned equity offerings is higher for firms with higher stock price, and firms are more likely to issue equity if they are listed for a shorter period. For example, a firm listed for 1 year is 260% more likely to issue equity than a firm has been listed for at least 20 years. All together, they find the effect of corporate lifecycle is empirically stronger,

as a firm listed for 1 year with poor timing opportunity is 71% more probable to issue equity compared to a firm listed for 20 years with good timing opportunity. Nevertheless, DeAngelo et al (2010) look at the primary reason why firms issue equity and they report without the proceeds from equity offerings, in the year after seasoned equity offerings, 81.1% of the firms would have subnormal cash balances, while 62.6% of the firms would have a cash balance of zero. In relation to DeAngelo et al (2010), Dittmar and Thakor (2007) assert that equity will only be issued to finance a project, rather than debt issue. Therefore, DeAngelo et al (2010) conclude that the primary reason for the firms issue seasoned equity is to meet the near term cash needs, the market timing opportunities, such as selling shares at high price or with higher stock returns compared with the past, and the effect of corporate lifecycle, which is the number of years listed, are only the secondary reasons for the firms making seasoned equity offerings, conditional upon meeting on the needs for the cash.

Further on, prior literatures have also found some relation between the equity market timing and information asymmetry. By looking at the intertemporal relationship between equity issues and information asymmetry for a group of non-financial and non-utility US companies, Autore and Kovacs (2010) find that the recent changes in the amount of information asymmetry play a significant role for equity issuers. They find that for the firms with low information asymmetry compared with recent past, for example, the smaller firms or the firms followed by a smaller number of analysts with high information asymmetry, the firms are more likely to issue equity rather than debt. Most importantly, Autore and Kovacs (2010) argue that this relationship is held strongly for the firms particularly with high levels of asymmetric information.

2.2.2 Other Part of the World Excluding the United Kingdom

De Bie and De Haan (2007) investigate the effect of past stock returns on the equity issuance for a sample of Dutch firms. They report that increases in stock returns lead to increases in the probabilities of the equity issues and dual issues. They argue that the effects of stock price appreciation on the issuance of debt, equity or both of debt and equity are in line with the predictions of pecking order and market timing hypotheses, but inconsistent with trade-off theory, as the trade-off theory suggests that stock price appreciation would bring down the debt ratio, and firms will issue debt rather than equity to take their debt ratio back to the optimal level. However, De Bie and De Haan (2007) does not find the evidence of the effect of the market to book ratio on the firms' issuance decisions. Nevertheless, different from Baker and Wurgler (2002) that the effect of stock returns on equity issuance has very long and persistent effects, De Bie and De Haan (2007) suggest that such effect is very short and transitory, that firms tend to adjust their capital structure back to their target levels shortly after the equity issuance, which is in line with the trade-off theory of capital structure.

Bruinshoofd and De Haan (2007) investigate the effect of market timing on corporate capital structure and they does not find any evidence of effect of market to book ratio on the capital structure in the continental European firms. However, they confirm that negative relationship between market to book ratio and historical debt ratio in the US can be attributed to the equity market timing effect that firms tend to issue equity when the market condition is favourable. Furthermore, Bruinshoofd and De Haan (2007) find a positive relationship between market to book ratio and financial leverage in the UK, they argue that high growth firms tend to issue debt rather than equity to maintain their financial flexibility, because debt has fewer restrictive covenants than other forms of financing, such as equity issues.

Based on sample firms from G-7 countries, Mahajan and Tartaroglu (2008) report that market to book ratio is negatively associated with historical debt ratio. However, they argue that this negative relationship cannot be explained by the equity market timing effect, because firms rebalance their capital structure to the optimal level shortly after the issuance of equity, and the market timing is transitory and short-lived, which is inconsistent with the result suggested by Baker and Wurgler (2002) that the market timing effect is very strong and persistent and it implicitly assumes equity issues preclude firms from rebalancing their capital structure. Therefore, Mahajan and Tartaroglu (2008) argue that the negative relation between market to book ratio and historical debt ratio is more consistent with the dynamic trade-off theory rather than the market timing effect.

Moreover, Celik and Akarim (2013) examine the impact of market timing on capital structure based on a sample of Turkish public firms, they find no evidence of market timing in Turkish firms, firms do not time the security issuance and they are not affected by whether the firms go public in hot market or cold market. Celik and Akarim (2013) conclude that the Turkish firms do not attempt to take the advantage of the overvaluation of equity.

Furthermore, Huang (2014) take a different aspect of market timing hypothesis by looking at the equity market liberalization in Taiwan, as the equity market liberalization helps to reduce the cost of equity and offer incentives for the managers to time the equity issues. As a result, Huang (2014) does not find any support for the equity market timing on firms' capital structure, and however, he finds evidence of dynamic trade-off theory that firms tend to maintain target capital structure before and after the equity market liberalization in Taiwan.

2.2.3 United Kingdom

Marsh (1982) investigates the security issue decision by the UK managers in choosing between equity and debt over the period of 1959 to 1974. He finds that the decision of issuing a financial instrument while needing a new method of finance is largely influenced by market conditions and past security prices. In addition, he argues that it appears firms seem to have a target capital structure while issuing a security. Further on, Marsh (1982) provides some insights into the choice between long-term and short-term debts, and he concludes that firms' choice of long-term and short-term debts is determined by firm size, assets composition and uncertainty about future inflation. For instance, first, larger firms normally have easier access to the capital market, and hence they may prefer to choose long-term debt. Rather, small firms prefer to use short-term loans because of the flotation costs and access to the capital market. Second, firms have tangible assets that can easily be collateralized tend to use long-term debt, whereas firms with few tangible assets or with current assets prefer to use short-term loans instead. Third, while the future level of inflation is not certain, to avoid the risk of inflation, firms tend to choose short-term or variable rate debts, rather than reply on the long-term fixed interest rate debt, which may potentially lower the value of the firm during the period of inflation.

Moreover, Hussain (2011) investigates the security issuance decisions of the UK firms and announces that equity mispricing significantly affect the firm's decision to issue debt and equity. He argues that both of the security issuance and repurchase decisions are affected by equity mispricing, firms tend to issue equity and repurchase debt when equity is overvalued, and also, firms issue debt accompanied by repurchase equity when equity is undervalued. He

concludes that firm's security issuance decisions are driven by the equity mispricing, and firms frequently substitute one form of external financing to another in an attempt to reduce the cost of capital and maximise the firm value. Hussain (2011) also confirms that firms deviate from their target capital structure because of the security market timing, and firms are likely to trade-off between the costs of deviating from the target capital structure and benefits gained from timing the debt and equity markets. Further on, Rau and Vermaelen (2002) argue that UK share repurchases are motivated by the regulation and taxation purposes, and Oswald and Young (2004) state that UK firms repurchase their shares when the share price fall providing additional support for the security market timing.

Based on a survey on CFOs of firms, Brounen et al (2006) argue that UK financial managers attempt to actively time the debt and equity markets. They point out that interest rate level, financing deficit, and equity undervaluation are the most important factors affecting the debt issuance, on the other hand, equity mispricing and changes in the share price are the most important factors affecting equity issuance in the UK.

Furthermore, Guney and Hussain (2010) assert that favourable share market condition offers a window of opportunity for the firms to issue equity. By looking at the IPO market timing, Guney and Hussain (2010) argue that firms that go public in the hot market issue significantly more equity than firms go public in the cold market, and hot market firms have much lower debt ratio than cold market firms. However, they contend that the IPO market timing effect does not persist over the long term, in other word, firms reverse their capital structure back to the target level shortly after the issuance of IPO.

Derrien and Kecskes (2007) investigate the initial public offering in the UK. They suggest that the UK firms tend to choose a two stage listing method to selling their shares in public market, to reduce the costs of information asymmetry between the time for initial listing and the time for selling their shares. Derrien and Kecskes (2007) also find that the UK companies experience significant stock returns before seasoned equity issues, the magnitude of prior issue stock return is much greater during the period between the time for the initial listing and the time for selling the shares.

2.3 Hypotheses

2.3.1 Stock Return

Generally, firms need to finance their corporate development phase, such as mergers and acquisitions and research and development, either through retained earnings, external debt or equity. Many prior literatures have recorded the effect of recent stock price changes on the security issuance decisions of the firms. Graham and Harvey (2001) report that the recent stock price appreciations is among one of the most important factors of issue of common stocks, in their survey based on the 392 CFOs about their financing decisions, over 60% of the people mentioned recent stock price increase as the important or very important determinants of their equity issuance decisions.

Lucas and McDonald (1990) argue the recent stock price appreciation present a window of opportunity to the equity issuers. They argue that equity issuing firm often exhibit a large and positive abnormal return both on firm level and market level returns. They mention that for the firms, which are undervalued because of the information gap between the managers and investors in the market, the firms defer their equity issue until the positive new information

have been released to the market. On the other hand, the firms that anticipate a decline on their future stock prices and overvalued, may issue equity immediately before they lose too much from the downward trend on the market valuation. A higher stock price compared with the recent past leads to a higher than expected stock return. It is assumed that the firm tend to issue equity right after a large positive stock return, and we expect that there is a positive relationship between the stock return and probability of equity issues.

Loughran and Ritter (1995) claim that seasoned equity issues happen after periods of high returns, and underperform subsequently compared with firms without seasoned equity issues, this underperformance effect is more significant for the firms issuing equity during the period of high volume of issuing activities. However, they find that the underperformance is neither due to the long-term return reversals, nor because of the beta differences. Moreover, they argue that the firms issuing equity appear to take the advantage of window of opportunities, by which means that their stock are overvalued before making issues. In addition, Bayless and Chaplinsky (1996) find that the managers attempt to time the equity market and there are window of opportunities to time the seasoned equity issues as long as the stock price is favourable. They also find that the window of opportunity exists partially from the reduced level of information asymmetry leading to stock price appreciation, which can be referred to the third hypothesis about information asymmetry.

Base on a sample of US firms, Welch (2004) investigates effect of stock returns on the firm's capital structure. He decomposes the causes of capital structure change into the stock returns and other corporate issuing motivations. He finds that while the stock returns factors are in place, the other firm characteristics variables such as profitability and earnings failed to

explain the much of the capital structure changes, and he concludes that the stock return is the primary factor for capital structure changes. Nevertheless, Welch (2004) announces that the US firms do not issue or repurchase debt or equity to account for the effect of stock returns on the capital structure changes, he does not find any evidence that firms adjust their capital structure back to the target level as a result of deviation from stock price change, which is inconsistent with the original trade-off theory. He concludes that firms' debt ratios drift away with their stock prices, but they tend not to optimize their capital structure by issuing equity.

Baker and Wurgler (2000) suggest that equity issues occur when the market peaks, and the managers can therefore benefit the most from selling overvalued equity. Nevertheless, similar to Loughran and Ritter (1995), they find that firms have poor subsequent performance and low stock returns after equity issuances. The underperformance and the negative post-issue abnormal return after equity issues has been documented by other literatures (Masulis and Korwar, 1986, Cheng, 1995; Spiess and Affleck-Graves, 1995; Johnson et al, 1996; Eckbo et al, 2000; Burch et al, 2004). Burch et al (2004) point out the reason for the underperformance after equity issues is because of that the managerial propensity to sell overvalued equity to the external investors is perceived by the outside investors, and the market does not respond fully to the information attached with the security issue announcement, which results in the negative return after equity issues, which is also documented in Jung et al (1996). Another explanation of the underperformance may due to the managerial failure to control for the risk while equity issuance.

De Bie and De Haan (2007) provide consistent evidence that the recent increase in stock price increase the probability of equity issues for a sample of Dutch firms. Kayhan and Titman

(2007) find that that stock price changes influence the firms' capital structure heavily and deviate their capital structure from its current level. Nevertheless, contrary to the findings of Baker and Wurgler (2002) that the market timing has strong and persistent effect on the capital structure over the long-term, De Bie and De Haan (2007) and Kayhan and Titman (2007) find that there is no evidence of such persistent effect. They argue that over the long-term, the capital structure of the firms tend to reverse from its deviation caused by the stock price changes and tend to adjust back to their optimal level, which is consistent with the trade-off version of capital structure.

Marsh (1982) examines the timing considerations on the choice between equity and debt for the UK companies between 1959 and 1974. He includes three variables to test the security issues of the companies at a given point of time, two of the variables reflecting the stock and bond market conditions respectively, and the third variable showing the firm-specific stock price performance during the year prior to the equity or debt issue. Marsh (1982) finds that the UK firms issue equity usually after a period of strong share price performance. Moreover, Marsh (1982) states that the choice between equity and debt is largely determined by the market conditions. Further on, he finds that the firms have a target debt ratio while issuing equity and debt, and the target debt ratio is a function of firm size, bankruptcy risk and composition of assets.

Consistent with Marsh (1982), Hovakimian et al (2004) find that equity issues are associated with high two year stock returns in the year and the year prior to equity issues, whereas debt issues are not affected by the stock returns. Additionally, they report that firms are more likely to issue equity and retire debt following large stock price increases, and firms are reluctant to

issue equity when the stock prices are low or underpriced. Further on, Hovakimian et al (2004) find that firms issue or repurchase equity or debt as they have target capital structures in mind, and the readjustments between the firms' current debt ratio to their optimal debt ratio is largely influenced by equity repurchases and debt retirements rather than equity issues and debt issues, as in banking sector, it is popular saying that managers have more discretion to repurchase equity or debt than to issue capital.

Derrien and Kecskes (2007) provide an interesting aspect of initial public offerings in the UK. IPOs are costly to the issuers because of the uncertainty in the value of shares. To account for this uncertainty, the share would have to be underpriced enough to attract the uninformed investors. Nevertheless, the cost of underpricing is expensive for the issuers. Different from the US, the UK stock market provides an alternative way of listing for the issuers to reduce the effect of underpricing caused by the uncertainty. As Derrien and Kecskes (2007, p.447) writes, "In the UK, issuers can choose between an IPO and an introduction, that is, a new listing unaccompanied by the sales of any primary and secondary shares." Therefore, the uncertainty in the valuation of shares is reduced between the two stages, which are stage of listing and stage of actually selling shares.

Derrien and Kecskes (2007) announce that in the UK firms deliberately choose the two stage offerings over the IPOs, and more importantly to this research, Derrien and Kecskes (2007) find that two stage firms attempt to time the equity market both during their initial listings and when they sell shares. They report that the firms tend to list in cold market, reduce uncertainty, cost of underpricing, then sale shares in hot market as IPOs when the equity valuations are high (Loughran et al, 1994).

Consideration arises for the treatment between IPOs and SEOs. SEOs occur when the equity market is favourable to the issuers, when there is a huge demand in equity and equity values are higher than average (Marsh, 1982; Bayless and Chaplinsky, 1996). Asquith and Mullins (1986) report a significant price increase of 20% every year in the two years preceding the SEOs, however the prior-issue stock returns for the IPOs represent only 3.3%. Having compared the differences of stylized facts between IPOs and SEOs, Derrien and Kecskes (2007) suggest that the rise in prior-issue share price of two stage IPOs in the UK is much smaller compared to the increase in share prices for SEOs. It can be seen that the IPOs share different characteristics compared to SEOs.

In this study, the stock return is measured by variable RETURN, which is defined as the continuous stock return for the year prior to equity or debt issue. Firms choose whatever the market is more favourable to them while raising equity or debt capital. Firms concern about the recent stock price run ups before issuing equity (Graham and Harvey, 2001), and also, they consider about the level of the current and future interest rates while approaching debt capital markets (Barry et al, 2009). Additionally, Asquith and Mullins (1986) find significant share price run-ups of 20% every year during the two years before equity issues. Furthermore, Marsh (1982) uses a market timing variable representing the company's stock performance over the year prior to the year of equity issues. It is expected that firms with high stock returns in the year before the issue are more likely to issue equity and firms with recent low stock returns are more likely to issue debt. Firms may issue debt and equity simultaneously instead of one at a time, as this dual issue consists of both debt and equity, the dual issue are less leverage-increasing than debt issue, and however, more leverage-increasing than equity issue,

and hence, the predicted signs for the effects of recent stock price run-up on debt issue versus dual issue and dual issue versus equity issue are identical to debt issue versus equity issue. The first hypothesis is shown as below.

H_1: Firm with recent high stock returns are more likely to issue equity and firms with recent low stock returns are more likely to issue debt.

2.3.2 Market Valuation

As prior literatures state, the market valuation is important to the managers and influences their equity issue decision. Empirically, prior literatures uses market to book ratio as the proxy variable measuring the market valuation of companies.

As Jenter (2005) states, managers have contrarian views about firms' market valuations and they perceive their firms are misvalued. Managers in firms with high equity market valuation view their shares as overvalued and managers in firms with low equity market valuation view their shares as undervalued. Accordingly, mergers and acquisitions, IPOs and SEOs are likely to occur when their market values of share price are high. Oppositely, stock repurchases are likely to occur when the share prices are low (Jenter, 2005). Jenter (2005) provides evidence suggesting that managers appear to frequently time the equity market both when trading in their own portfolios as a window of their own beliefs, and when making firm level corporate decisions. In addition, Jenter (2005) asserts equity issues are motivated by exploitation of overvalued equity, rather than growth opportunities and needs of capital for the firms' corporate investments. Furthermore, Jenter (2005) mentions that M&As are more likely to be motivated by the overvalued equity as a result from equity mispricing as a method of payment

rather than the traditional value creation, he reports that firms may undertake a negative NPV project if the equity is overvalued, on the other hand, firms may give up positive NPV project if the equity is undervalued and the cost of underpricing is expensive to the acquirers.

Similar argument has been supported by Shleifer and Vishny (2003), they report that when the equity of acquirers are overvalued, the motivation for acquisition is not to create value, but to gain some of the market overvaluation, and especially, by acquire the less overvalued target with overvalued stock. Graham and Harvey (2001) support the argument of Jenter (2005) and report there are nine firms point out that they issue equity because this is the most favoured "currency" to make acquisition. Nonetheless, as value creation is important to the firms as well as their outside shareholders, most probably firms will undertake M&As if both the method of payment is desirable and the project is profitable.

In the survey evidence of Graham and Harvey (2001, p.230), they report that "magnitude of equity undervaluation or overvaluation" is considered as the second most important factors by manager issuing stock, with almost 70% of CFOs concern this factor as the important or very important while making decisions. Also, Baker and Wurgler (2000) and O'Brien et al (2007) assert that managers tend to issue equity when it is overvalued, and managers prefer to issue debt or repurchase equity when equity is undervalued. Baker and Wurgler (2000) and Hovakimian et al (2004) find a negative relationship between market to book ratio and firms' leverage. Furthermore, Asquith and Mullins (1986) state that firms tend to issue equity following a rise in equity value, and the equity issues tend to be small following a reduction in equity value. Nevertheless, DeAngelo et al (2010) and Jenter et al (2011) argue that the managers timing ability may be perhaps due to their hubris or overconfidence. Furthermore,

Ben-David et al (2007) show that there is a close association between the managerial overconfidence and furious corporate policies.

Jenter et al (2011) consider the importance of market timing on the managerial decision of issuing financial derivatives and investigate whether or not managers successfully time the put sales. Jenter et al (2011) provide empirical evidences that they suggest managers are able to time the put sales by identifying the undervalue equity. Also, they point out that managers actively time the volatility of stock returns, that is, as the put option value increases when the volatility of stock returns increases, managers are likely issue put options when they believe the volatility is expected to be lower than the investors believe, so when the put options are overvalued. Third, they find no evidence that managers try to manipulate their shares before the put option expires. In contrast with DeAngelo et al (2010), Jenter et al (2011) present in their paper that the managerial timing belief on put sales as part of market timing is based on more than the managerial overconfidence.

Baker and Wurgler (2002) investigate the equity market timing and imply that there is an inverse relation between the adverse selection costs of information asymmetry and the market valuation of equity. They point out that the market misvaluation of equity is perceived by the managers as the opportunities to raise external equity, and they argue that this effect of market valuation is large and persistent. They write, “The influence of past market valuations on capital structure is quite persistent...The impact of past market values turns out to have a half-life of well over ten years. For example, capital structure as of the year 2000 depends strongly upon variation in the market to book ratio from 1990 and before, even controlling for the 1999 value of market to book.” This persistence is used to compare with traditional

version of capital structure, as the trade-off theory suggests, the managers consider the capital structure as there is a target level in mind by trading off the costs and benefits of debt, because they can benefit from the target debt level to maximise their firm value, and therefore, managers tend to rebalance the capital structure by moving away the effect of equity market timing that reduces the target level of debt to equity ratio. Empirically, Baker and Wurgler (2002) examine the significance of market to book ratio, as a proxy of market valuation on the capital structure, and they conclude that the effect of market timing is very significant and persistent and the firms do not adjust their capital structure to their target levels after equity issuance.

Baker and Wurgler (2002) argue that historical stock price has large and persistent effect on the capital structure. As they state, firms issue equity when their market prices are high, compared with the book value in the past, on the other hands, firms repurchase equity when their market prices are low. Moreover, Baker et al (2004) document that with irrational investors, managers tend to exploit the overvaluation of equity. They assert managers tend to issue overvalued equity and on the other hand, repurchase equity when it is undervalued. Furthermore, O' Brien et al (2007) report when the market prices of stock are high, firms issue overvalued equity and use the proceeds to repay debt, and when the stock prices are low, firms issue debt and use the proceeds to repurchase undervalued equity. Previous literatures provide empirical support on the effect of stock price changes on this equity market timing considerations (Lee, 1997; Hovakimian et al, 2001; Jenter, 2005; Chazi and Tripathy, 2007; Dittmar and Thakor, 2007).

Conversely, recent studies have received considerable attentions on the long-term impact of

equity market timing on the capital structure of firms. Hovakimian (2006) re-questions the finding as suggested by Baker and Wurgler (2002), whether the historical market to book ratio influences the firm's equity issuance decision, and whether the effect of such market timing behaviour on the firm's capital structure is very large and persistent. However, Hovakimian (2006) finds no such evidence and contends that this effect is only very small and short lived, which is also supported by Leary and Roberts (2005) and Alti (2006), that the effects of equity issue on debt to equity ratio disappear within four years after issue, and firms readjust their capital structures back to the target levels after equity issues.

Hovakimian (2006) provides a different and interesting result, he suggests the relationship between market to book ratio and leverage is more closely related to dynamic pecking order theory, that is, firms issue equity to finance the upcoming investment opportunities. To illustrate, Hovakimian (2006) points out the association between the market to book ratio and leverage is more cross sectional than time series, firms with high market to book ratios are more likely to issue equity in the recent period, and firms with low market valuations are more likely to issue debt in the recent period, he also reports that there is a positive association between past market to book ratio and current investment opportunities (indicated by the capital expenditure and research and development expenditure). Therefore, Hovakimian (2006) contends, the market to book ratio is more an indicator of growth opportunities, than of equity market timing. However, Dittmar and Thakor (2007) report that the capital expenditure increase significantly after equity issue, but not after debt issue, they support that equity will only be issued to finance projects. Altogether, it may show that an increase in market to book ratio leads to an increase the level of equity, and then an increase the capital expenditure to finance growth opportunity.

Furthermore, Alti (2006) investigates the long-term effect of market timing on capital structure by focusing on the initial public offerings for the firms in hot-market and the firms in cold-market respectively, the hot-market and cold-market are characterized by trading volume in terms of the number of IPOs. The research of Alti (2006) aims to determine whether the impact of equity market timing on the capital structure leading to lower leverage persistent over the years following the IPOs. Different from other studies that use market to book ratio as the proxy for equity market timing, Alti (2006) measures market timing as a function of market condition by differentiating hot-market and cold-market in terms of the number of IPO issuers. Alti (2006) finds that substantial IPOs take place in hot-market as the issuers consider the favourable market condition as a window of opportunity with a temporarily low cost of equity, whereas cold-market issuers are likely to keep their proceeds at minimum, as the market condition is less favourable. Regarding to the persistence of the effect of equity market condition, Alti (2006) provides consistent results with Hovakimian (2006) that the effect of hot-market IPO on capital structures is small and transitory, which is contrary to Baker and Wurgler (2002), and the result suggest trade-off theory plays a more important role on the capital structure of firms as managers tend to attain their optimal capital structure and maximise their firm value by trade-off between the costs and benefits of both debt. Alti (2006) suggest that firms quickly reverse their deviations of capital structure to their desired level after equity issuance. He reports that one year after the year of IPO, more than half of the effect on leverage disappears, and two years subsequent to the year of IPO, the hot-market effect on leverage completely vanishes. However, the cold-market issuers appear to be more content with their leverage ratio as they attain at IPO, and the cold-market issuers do not significantly change their capital structure after equity issues.

In accordance with Hovakimian (2006), Alti (2006) and Mahajan and Tartaroglu (2008) examine the effect of equity market timing on the capital structure for G-7 countries, they find that except Japan, the effect of past market to book ratio has negative impact on the leverage of firms, however, this impact is small and transitory and only lasts for at most five years after equity issuance. As argued by Mahajan and Tartaroglu (2008), the result shows that the market timing hypothesis displays more consistency with the dynamic trade-off theory of capital structure, as firms readjust their capital structures to the optimal level.

Furthermore, Burch et al (2004) investigate the equity market timing by exploitation of overvalued equity with respect to two different contractual forms for equity issues, firm commitments and rights offers. They find that both firm commitments and rights offers occur following recent price run-ups. However, having examined the post offer stock performance, they provide evidence that the post offer abnormal performance of firm commitment offers is much more negative than the performance of right offers. Therefore, Burch et al (2004) summarize that post offer underperformance following firm commitment offers is related to equity market timing, and they assert that managers want to take advantages of overvalued equity may simply choose firm commitment offers, whereas the managers choose right offers are less likely to perceive their equity as overpriced.

To some extent, the measures of stock return and market valuation in this thesis are similar, as stock return is calculated as the logarithm of RI_t (total return index) at the end of the year preceding equity or debt issue divided by RI_{t-1} at the beginning of the year before the issue, whereas, market valuation is defined as market to book ratio, which is calculated as market

value of common equity (daily closing price at the book value date) divided by book value of common equity in the year before the issue.

The similarity is that both of them display the valuation of the share price to some degree, for example, if share price is high at the end of the year before the issue, the stock return during that year tends to be high and, the market valuation at the end of that year is also likely to be high. Nevertheless, the difference between the two variables is that the stock return variable shows the firm's stock performance during the year before the issue, whereas the variable for market valuation represents the stock value at a single point in time, which is the date of book value that is the end of calendar day prior to the year of issue. Therefore, we can see that one of the variables measures the changes of share price, and another of the variables measures the share price level, however, both of them share some similar characteristics of the market value of the stocks before the year of issue.

The "magnitude of equity undervaluation/overvaluation" is considered as one of the most important factors affecting equity issuance decisions (Graham and Harvey, 2001, p. 230). Although market to book ratio has been used as a proxy for growth opportunities, it also has been perceived as a proxy for equity market valuation in market timing studies and used to test the managerial behaviour on timing the equity issues in these studies (Rajan and Zingales, 1995; Hovakimian et al, 2001; Baker and Wurgler, 2002; Jenter, 2005; Hovakimian, 2006; Dittmar and Thakor, 2007; Elliott et al, 2008; DeAngelo et al, 2010). Baker and Wurgler (2002) suggest that "capital structure is the cumulative outcome of attempts to time the equity market", and this effect on the capital structure of firms is quite large and persistent. Dittmar and Thakor (2007) find that equity issuers have significantly high market to book ratios on

company level and industry level. In this study, I use an alternative specification for the market valuation of equity, which is the industry adjusted market to book ratio in the year prior to equity issues. The industry adjusted market to book ratio equals to the book value of total assets minus book value of equity plus market value of equity to book value of total assets minus its industry average value, by utilizing the industry adjusted market to book ratio, it can help to determine whether the company's assets are overvalued or undervalued. It is expected that firms are more likely to issue equity when the industry adjusted market to book ratio is high, and firms are more likely to issue debt when the industry adjusted market to book ratio is low. The predicted signs for the effects of industry adjusted market to book ratio on debt issue versus dual issue and dual issue versus equity issue are identical to debt issue versus equity issue. The hypothesis two is shown as follows.

H_2: Firms are more likely to issue equity when industry adjusted market to book ratio is high and firms are more likely to issue debt when the industry adjusted market to book ratio is low.

2.3.3 Information Asymmetry

As Myers (1984) and Myers and Majluf (1984) argue, issuing equity is expensive because of the agency costs of issuing equity arising from the information asymmetry between the insiders and outside investors. The implication behind this is related the adverse selection costs of information asymmetry, because while issuing equity, managers and insiders possess more valuable information about the value of the firms than the investors, the informed investors are able to buy the cheap shares, whereas the uninformed investors can only buy the overvalued shares, ultimately, the uninformed investors will leave the market. Therefore, in order to keep the uninformed investors and make them remain in the market, the newly issued

shares will have to be underpriced enough to attract the uninformed investors, and the market penalizes the overvalued equity issues, hence the issuers must bear the costs of underpricing, which is very expensive. This is the basis of the pecking order theory previously developed. Due to high cost of underpricing as a result of issuing equity, hence the firms prone to finance themselves, first, from retained earnings, second, from external debt, and third, from equity.

Dittmar and Thakor (2007) document the "time-varying adverse selection" that managers are likely to issue equity when the adverse selection costs of equity are low, in other words, the levels of information asymmetry between the managers and external shareholders are low, at what time the stock prices are generally higher compared with stock prices when there are high levels of information asymmetry. Moreover, Dittmar and Thakor (2007) find that if the managers believe the investors have high probability to agree with the future projects' payoffs as those of managers, which is so called "managerial investment autonomy", and then the managers are more likely to issue equity when the agreement on the future projects' incomes between the managers and investors are aligned together. Otherwise, when the agreement is low, the managers are more likely to issue debt.

Autore and Kovacs (2010) test the relationship between information asymmetry and equity issues for a sample of US non-financial firms, they find that the equity are more likely to be issued in the period of low information asymmetry compared with the recent past. In addition, this effect is particularly strong for the firms with high levels of information asymmetry, as these firms will benefit most by issuing equity after temporarily low levels of information asymmetry. Furthermore, they argue that firms tend to reduce their information asymmetry before equity issues to lower their costs of issuing equity. Autore and Kovacs (2010) state that

the levels of information asymmetry have strong association with the firms' corporate financing decisions. Nevertheless, Frank and Goyal (2003) and Leary and Roberts (2010) argue that firms issuing equity have high information asymmetry, which are contradict with the findings of Autore and Kovacs (2010) that firms with high information asymmetry issue equity after decreases in their information asymmetry.

Bharath et al (2009) investigate whether information asymmetry affect the capital structures of the US firms over the period of 1973 to 2002. They suggest that information asymmetry has negative influence on the firms' equity issuance, and the increase in information asymmetry or adverse selection costs of information asymmetry leads to the increase in debt issuances that are used to finance the deficits.

Krishnaswami and Subramaniam (1999) examine the information asymmetry and investigate whether the spin-offs of the firms or the separation of the firm into independent operating divisions, enhances the value of firms. They find that firms engage in spin-offs have higher levels of information asymmetry compared to their same-size and industry counterparts, and their information asymmetry problems decrease significantly after spin-offs. Next, they ascertain that firms with greater investment opportunities and greater needs of external financing engage in spin-offs more frequently among others. Moreover, firms usually reduce their information asymmetry before entering the capital market for external equity financing. Further on, the empirical analysis of Krishnaswami and Subramaniam (1999) shows some connections between information asymmetry, market valuation and equity issuance, they argue that firms with higher levels of information asymmetry and diversified are more likely to engage in spin-offs, as higher information asymmetry leads to lower values, firms use

spin-offs to reduce their information asymmetry and improve their market valuation before equity issues in the capital market. Therefore, firms tend to issue equity following the spin-offs, the adverse selection costs result from information asymmetry are decreased following spins-off, the undervaluation of equity is improved and the equity issues are more cheaper, vice versa.

Dierkens (1991) tests the relationship between information asymmetry and equity issues and provides evidence that information asymmetry is strongly related to equity issues. He reports several findings on the effect of information asymmetry on firms' equity issuance decisions. First, they argue higher information asymmetry is associated with lower stock prices at the announcement of equity issues. Second, firms tend to time the equity market by reducing their information asymmetry before the equity issuance announcement. Likewise, Asquith and Mullins (1986) state that firms issuing equity tend to minimize the adverse selection costs arising from information asymmetry. Bayless and Chaplinsky (1996) investigate whether there is a window of opportunity arising from time-varying adverse selection for seasoned equity issues, they find equities are often issued in a period of low information asymmetry.

Chang et al (2006) evaluate the effect of analyst coverage that is used to represent the level of information asymmetry on the security issuance decisions of firms. They find that the number of analyst covering the firm is negatively associated with the level of information asymmetry. They provide empirical evidence that equity market timing exists that firms tend to issue equity as opposed to debt for the firms that have higher analyst covering than the firms with little analyst coverage. Moreover, they point out that while there are a great number of analysts existing, the level of information is low, the favourable equity market condition such

as high recent stock return or high market valuation, becomes less pronounced than the information asymmetry in explaining the equity market timing. Chang et al (2006) include firm size as one of the proxies for the information asymmetry, and find the association between information asymmetry and equity issue is economically strong, they suggest that this effect is strongest for the smallest firms. This finding is consistent with the findings of Autore and Kovacs (2010) that firms are more likely to issue equity when the information asymmetry is low compared to the recent past, and this effect is particularly strong for the firms with high levels of information asymmetry in place.

Korajczyk et al (1991) and Korajczyk et al (1992) test the effect of time-varying information asymmetry between better informed managers and less informed outside investors on equity market timing, they assume as the time passes, the adverse selection costs become more severe because more managers receive new private information, and hence the drops in stock prices to account for the information asymmetry increase over time. Korajczyk et al (1991) and Korajczyk et al (1992) find that equity issues cluster after information releases, which is consistent with the information asymmetry hypothesis that equities are issued in a period of low information asymmetry. For the firms with high quality assets, the informed managers tend to defer their equity issues until the market becomes better informed, the uninformed managers also prefer to wait until they becomes more informed, and then decide whether to issue now or wait until the outside investors are informed. On the other hand, for the firms with low quality assets, the managers are more likely to issue equity immediately to exploit the information asymmetry rather than to defer (Korajczyk et al, 1992). Further on, Lucas and McDonald (1990) document the phenomenon that managers knowing private information have incentives to defer equity issues and to increase stock price is very persistent.

Interestingly, Aboody and Lev (2000) corroborate that the root of information asymmetry and insider trading gains is the research and development activities, as R&D intense firms have substantially higher insider gains than the firms with little or without R&D. Furthermore, Chae (2005) explores the relationship between trading volume and information asymmetry. He reports that before the scheduled earnings announcements, the trading volume is inversely related to the levels of information asymmetry.

Information asymmetry is measured by firm size, which is the natural logarithm of total sales in the year prior to equity issue. Adverse selection costs of information asymmetry while issuing equity is a dominant factor in capital structure decisions as suggested by the pecking order theory. Barclay and Smith (2005) report that equity issues are the most expensive type of external financing and have the largest out of pocket transaction costs and information costs, long-term bond issues especially for the speculative graded firms are the second most costly, short-term and private debt issues are the least costly. Accordingly, they argue that seasoned equity issues are rare and short-term debt issues are the most common type of financing method among the companies.

However, unlike what the pecking order theory suggests that firms only issue equity as the last resort of finance because of the information asymmetry, costs of information asymmetry is among the one of the many factors that are considered by the managers when they issue equity, firms issue equity more frequently than expected and equity issues are typically not done by the firms under financial constraints (Fama and French, 2002; Frank and Goyal, 2003). Equity can be issued when the adverse selection costs of information asymmetry are

minor (Dierkens, 1991; Krishnaswami and Subramaniam, 1999; Bharath et al, 2009; Autore and Kovacs, 2010) or firms simply avoid equity issues when involving information asymmetry problems (Morellec and Schurhoff, 2011). However, Dittmar and Thakor (2007) argue that large firms tend to issue debt as opposed to equity, because debt is less costly, compare to information sensitive securities such as new equity. Firms tend to trade-off between the benefits and costs of issuing equity and they issue equity when the benefits outweigh the costs of equity issuances, for example, stock mergers often have tax benefits that can be used to offset the costs of equity issuance.

Firm size indicates the levels of information asymmetry between the managers and external shareholders (Chang et al, 2006). Rajan and Zingales (1995) argue large firms may have low adverse selection costs compared to small firms and they tend to issue information sensitive securities, such as equity, and hence less levered. Moreover, Titman and Wessels (1988) supports that small firms pay much more than large firms to issue equity and also long-term debt in the capital markets, they may prefer to borrow short-term debt because of less cost and tend to be more levered than large firms. When the creditors are less willing to lend their money, or when macroeconomic factor such as the interest rates grow because of challenging economic environment, the lenders tend to assess the creditworthiness of the borrowers more strictly. Large firms have been in the business for a long time with more solid operating history and better future prospects compared to small firms, and hence they are more attractive to lenders. Capital market players, no matter creditors, underwriters or issuers, make their decisions based on multi factors, not a single factor like firm size. According to the studies of Bharath et al (2009), Autore and Kovacs (2010) and Morellec and Schurhoff (2011), information asymmetry is measured by the firm size, which is the logarithm of total assets in

the year prior to the equity issues, as large firms often have less information asymmetry than small firms.

In addition to firm size, corporate governance index is used as another measure of information asymmetry. Corporate governance index includes five corporate governance characteristics, which represent board size, fraction of independent non-executive directors on board, fraction of audit committee members on board, independence of audit committee and CEO duality respectively. The corporate governance index equals to the sum of these corporate governance characteristics, and the higher the level of corporate governance index, the better the corporate governance quality of the firm.

As Mande et al (2012) point out, the probability of equity issue versus debt issue increases as corporate governance quality increases, they suggest that firms are more likely to issue equity as corporate governance quality increases. From agency costs point of view, the increase in corporate governance quality would reduce the agency costs of external financing, which leads to increase in external financing, such as equity and debt. Mande et al (2012) argue that while the reduction in agency costs leads to both equity and debt financing with cheaper and easier access, and however, equity financing is more likely to benefit from the decrease in agency costs because of the improved corporate governance quality compared to debt financing. Moreover, Mande et al (2012) state that firms facing highest agency costs benefit the most from investing in corporate governance mechanisms that reduce the agency costs. In addition, Florackis and Ozkan (2009) investigate the effect of corporate governance on the capital structure based on a sample of UK firms from 1999 to 2004, and they report that firms with strong corporate governance quality are able to raise more debt as a result of reduction in

agency costs than firms with weak corporate governance quality.

To my knowledge, there has not been any previous UK studies on the influence of corporate governance quality on the choice between equity and debt. Corporate governance is a form of the monitoring and controlling mechanism that limit the managerial behaviour from engaging in activities such as consumption of perquisite, financial fraud, corporate abuse, investing in non-profitable projects, losing valuable investment opportunities, taking excessive risks and so on and so forth, as a result, these behaviour would create the conflict of interests between corporate managers and external shareholders.

More importantly, the increase in corporate governance quality would help to mitigate the information asymmetry between corporate managers and shareholders. As shareholders are often at a disadvantageous situation when managers know more about the company and act at the detriments to the external shareholders, the improved corporate governance would reduce the information asymmetry, and hence, it would alleviate the conflict of interests between managers and shareholders as well as the agency costs of external financing, leading to easier and cheaper access to the debt and equity capital markets because of the lower cost of external capital.

The corporate governance index consists of five corporate governance characteristics, which are board size, fraction of independent non-executive directors on board, fraction of audit committee members on board, independence of audit committee and CEO duality. First, as previous studies suggest, the communication and coordination of small board are often more efficient than large board, and managers on large board tend to become entrenched and have

more freedom to pursue their personal interests to the detriments of external shareholders (Jensen and Meckling, 1976; Yermack, 1996; Huyghebaert and Wang, 2012). Therefore, I predict that the firms with smaller board size tend to have better corporate governance quality, and I assign a score 1 for good corporate governance quality if board size equals to or less than the median value of board size in my sample, 0 otherwise.

Second, the UK Corporate Governance code set out that in large companies, at least half of the board members should be independent non-executive directors excluding the chairman, and in terms of the small companies, at least two board members should be independent non-executive directors. In addition, it is argued that greater proportion of independent non-executive directors is associated with better corporate governance quality (Fu and Liu, 2004; Huyghebaert and Wang, 2012; Mande et al, 2012). Therefore, I expect that firms with higher proportion of independent non-executive directors on board tend to have better corporate governance quality, and I assign a score 1 for good corporate governance quality if the percentage of independent non-executive directors on board equals to or greater than the median value of the percentage of independent non-executive directors on board in my sample, 0 otherwise.

Third, the UK Corporate Governance Code stipulates that large companies should nominates an audit committee of at least three members and small companies should have at least two audit committee members, all of whom must be independent non-executive directors. Out of the audit committee members, at least one member must have recent and relevant financial expertise. Moreover, Anderson et al (2004) and Mande et al (2012) announce that firm's corporate governance quality increases with the increase in the number of audit committee

members on board, who involve in the monitoring and protecting the financial reporting process of the firm. Therefore, I assume that firms with higher presence of audit committee members on board tend to have better corporate governance quality, and I assign a score 1 for good corporate governance quality if the percentage of audit committee members on board equals to or greater than the median value of the percentage of audit committee members on board in my sample, 0 otherwise.

Fourth, it is considered that an audit committee on board is independent from management if the audit committee only comprises of independent non-executive directors. Anderson et al (2004) argue that firms with independent audit committee can provide more transparent financial reporting that are unaffected by the management. Mande et al (2012) also report that firms with independent audit committee have better corporate governance. Therefore, I expect that firms with independent audit committee tend to have better corporate governance quality, and I assign a score 1 for good corporate governance quality if the audit committee is independent from management, 0 otherwise.

Fifth, firms are likely to have better corporate governance if CEO is not chairman. As Jensen (1993) argues, if the CEO has too much power, the greater the conflict of interests between managers and shareholders. Also, Shleifer and Vishny (1986) claim that CEO would become entrenched if he or she is also the chairman of the company, which leads to ineffectiveness in terms of monitoring and controlling the managerial behaviour. Therefore, I predict that if different people fulfil the roles of chairman and CEO, these firms tend to have better corporate governance quality, and I assign a score of 1 for good corporate governance quality if CEO is not chairman on board, 0 otherwise. The corporate governance index is the sum of

the scores of five corporate governance characteristics, and the minimum value of corporate governance index equals to zero and the maximum value equals to five. The higher the corporate governance index, the better the corporate governance quality of the firm.

In this study, I expect the firms with lower information asymmetry, as measured by firm size and corporate governance, are more likely to issue equity and firms with higher information asymmetry are more likely to issue debt. The predicted signs for the effects of information asymmetry on debt issue versus dual issue and dual issue versus equity issue are identical to debt issue versus equity issue. The third hypothesis is defined as follows.

H_3: Firms that have low information asymmetry are more likely to issue equity and firms that have high information asymmetry are more likely to issue debt.

2.3.4 Investment Opportunity

Based on a sample of US firms, Dittmar and Thakor (2007) argue that firms tend to issue equity following increases in their share prices to finance good investment opportunities, and they tend to finance their capital expenditures with the proceeds of equity issues. They find capital expenditure increases significantly after equity issues, and the effect is particularly strong for the firms that there are high agreements on the future investment payoffs between managers and outside investors. Dittmar and Thakor (2007) argue that firms do not finance their capital expenditure using debt issues. Contrary to Dittmar and Thakor (2007), Byoun (2008) argues that firms have propensity to preserve their debt capacity for future financing needs and to avoid the equity issuance in the future.

DeAngelo et al (2010) investigate the reasons for seasoned equity issues in the US. They argue that the near term financing need is the primary motive for equity issue, and the market valuation of equity issues and corporate life stage that the shorter the firms list, the more likely the firms conduct seasoned equity issues, are only the secondary reasons. DeAngelo et al (2010) assert that equity issues help to finance investment opportunities. However, even if the capital expenditures are flat, 40.3% of the seasoned equity issuers would run out of cash without the proceeds of equity issues, and 59.6% of the issuers would have subnormal cash balances after the proceeds of equity issues. DeAngelo et al (2010) summarize that only when the near term cash needs are met, the market timing opportunities, such as market valuation and corporate lifecycle, can help to explain the equity issuance behaviour of the US firms.

Kim and Weisbach (2008) examine the issue behaviour for both IPOs and SEOs. They find that for both the firms issue IPOs and SEOs, while the market valuations of equity are high, firms tend to issue equity to exploit the advantages of high market valuation, and then to use the equity capital to finance the investment opportunities. According to the estimates of Kim and Weisbach (2008), the R&D expenditures raise by 18.5% for each dollar of equity capital raised in the year following the IPOs, and the R&D expenditures increase by 17.8% for each dollar of equity capital raised in the year following the SEOs. Nonetheless, in contrast with DeAngelo et al (2010), Kim and Weisbach (2008) ascertain that the motives behind the SEOs do not lie primarily in the needs of raising external capital to finance the investments, which is suggested by DeAngelo et al (2010). Kim and Weisbach (2008) argue that the reasons for equity issues can both result from the motive of taking advantages of favourable market conditions, or the need to raise external equity capital to finance the investments. Specifically, they report that for the firms with high market to book ratio tend to conduct SEOs to exploit

the market overvaluation, and keep proceeds as cash compared to firms with lower valuations, and the firms use their proceeds to fund their investments such as acquisitions and purchasing equity. Furthermore, Axelson et al (2006) and Kim and Weisbach (2008) state that firms use equity issues to finance a number of projects for a long period of time.

Alti (2006) supports that equity issuer has more propensity to take advantage of favourable market condition than the need to raise external equity capital. He reports that the hot market issuers invest less in investment opportunities than the issuers in cold market in the year of IPO, and in the years subsequent to IPO, the investments of hot-market issuers and cold-market issuers do not differ significantly.

Graham and Harvey (2001) report that based on their survey that about 30% of the CFOs consider the riskiness of equity and the need to raise sufficient capital to finance the corporate activities as the two of the important determinants while conducting equity issues. As Graham and Harvey (2001) announce, some firms indicate that they issue equity because equity is the most favourable choice of financing for their corporate investments. Empirically, Choe et al (1993) find that firms issue substantial amount of equity to finance their expansionary phase of business cycle. Moreover, they provide evidence that relates to adverse selection costs of information asymmetry that firms tend to issue equity to finance projects when their adverse selection costs of information asymmetry as measured by the negative returns following equity issues is temporarily low, at the same time with more promising investment opportunities and less uncertainty about the firms' assets in the market.

Similarly, Myers and Majluf (1984) argue that adverse selection costs accompanied with new

equity issue is less severe if the NPV of investment opportunity is more positive, hence the negative post offer return following equity issue is improved significantly. In contrast, Denis (1994) examines the relation between the profitability of investment opportunities and the negative market reaction following equity offerings in the US, and he finds very limited evidence that there is a positive association between the profitability of investment opportunities and the negative post offer return for a sample of high growth firms. Denis (1994) concludes that profitability of investment opportunities only plays a small role in explaining negative return after equity issues. Collectively, equity issues are used to finance investment opportunities, and if the projects are profitable enough, the negative post offer return resulting from the costs of information asymmetry is less pronounced (Myers and Majluf, 1984; Choe et al, 1993). Different from the previous information asymmetry hypothesis that firms tend to reduce information asymmetry before equity issuance, the arguments here reflects ex post that the extent of negative return after equity issues is determined by the profitability of the investment opportunities.

In addition, Baker et al (2004) provide survey evidence of behavioural finance and document that there are empirical link between investment and market valuation of shares. They argue that firms that are lack of money are likely to pass up profitable projects when their shares are undervalued. Furthermore, they document that undervalued firms tend to underinvest rather than issue undervalued shares. Likewise, Lucas and McDonald (1990) argue that managers time the equity market by conducting equity issues when their shares are overvalued or after recent price run ups, even at the expense of foregoing attractive investment opportunities. Barberis and Thaler (2003) argue that the undervalued firms may delay or forego good investment opportunities because it is too expensive to finance themselves with undervalued

equity. Furthermore, Barberis and Thaler (2003) report that overvalued firms tend to invest more by issuing overvalued equity compared to other firms.

Jung et al (1996) examine the security issuance decision of firms on whether to issue equity or debt and provide several interesting findings that are consistent with the assumption that firms issue equity to finance investment opportunities. They find that firms with profitable investment opportunities tend to seek external equity financing, and there is a positive association between the profitability of investment opportunities and the post issue stock return. However, firms with less profitable investment opportunities tend to issue debt.

McLean (2011) investigates the relationship between equity issue and cash saving and provides evidence that cash saving increases with equity issue because of the precautionary motives for research and development expenses and industry cash flow variance, and the positive relationship between equity issue and cash savings effect is greater for the firms with higher precautionary motives, for example, the firms with higher future R&D expenses. He argues that precautionary motives become increasingly important for share issuance during the sample period between 1971 and 2008 that shows an upward trend in firms' investments. Furthermore, McLean (2011) reports that firms take advantage of market overvaluation of equity to build up financial slack, however, he does not finds an negative association between share issuance and post offer stock performance as suggested by prior literatures (Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995; Burch et al, 2004).

Gatchev et al (2009) examine how do firms finance investments and find that firms are more likely to use equity to finance internal investment, such as R&D and advertising, compare to

external capital expenditure such as acquisition. Consistent with Fama and French (2005), Gatchev et al (2009) do not find evidence that firms only consider equity as the last resort to finance their investments as suggested by pecking order theory, and they report that firms frequently issue equity although when the information asymmetry is likely to be high. Furthermore, in line with Gatchev et al (2009), Morellec and Schurhoff (2011) assert that firms choose equity to finance growth opportunities and the equity are not typically issued under financial duress.

Gatchev et al (2009) report that firms raising capital from both equity and debt capital market when they need to finance their capital expenditures. However, for small, high growth and low profit firms or the time when they need to finance their intangible assets such as research and development, Gatchev et al (2009) find that these firms issue more equity compared to debt. In consistent with Gatchev et al (2009), Frank and Goyal (2003) and Morellec and Schurhoff (2011) also find that firms tend to finance their growth options by issuing equity. Recent literatures show that firms with more promising growth opportunities are associated with less negative post issue stock return, which is about 3% of share price at issue as reported by Barclay and Smith (2005). In this study, I use two distinct measures of the investment opportunities, which are capital expenditure and research and development expense. Investment opportunities are the new investments that have potentials to produce great future economic benefits for the companies and their shareholders. Both of the measures reflect the level of firms' financing needs in the year prior to equity issues.[3] Capital expenditure is defined as capital expenditure to total assets in the year prior to equity issuance, and research and development is defined as research and development expense to total sales

[3] Capital expenditure represents the investment in the real project, and research development expense represents the investment into the intangible assets of the company that will not transfer to the real value in short-term.

in the year before equity issue, The missing values of R&D expenditures are set to zero, which means that firms have no R&D expenses in the year before equity issues. It is predicted that firms with high level of investment opportunities are more likely to issue equity and firms with low level of investment opportunities are more likely to issue debt. The predicted signs for the effects of investment opportunities on debt issue versus dual issue and dual issue versus equity issue are identical to debt issue versus equity issue. The fourth hypothesis is shown as follows.

H_4: Firms with high investment opportunities are more likely to issue equity and firms with low investment opportunities are more likely to issue debt.

2.3.5 Credit Rating

The relationship between credit rating and capital structure of firms has been examined in recent studies (Graham and Harvey, 2001; Kisgen, 2007; Hovakimian et al, 2009; Judge and Mateus, 2009; Tang, 2009; Mittoo and Zhang, 2010; Kisgen, 2012). Graham and Harvey (2001) report on their survey that managers pay attention on firm's credit rating while issuing debt. Also, Kisgen (2007) examines how credit rating affect capital structure and find that the costs and benefits associated with credit rating directly affect the firm's decision to issue debt or equity. For example, firms near a credit rating upgrade or downgrade issue relatively less debt as opposed to equity than firms not near a credit rating change, because the credit rating change would affect the costs of external borrowing, such as access to the debt markets with lower interest rate, and hence it would directly affect the costs of financing firms' investment opportunities. Moreover, credit rating would transfer the signal to the outside investors about the creditworthiness of the corporate firms, and firms with better credit ratings would be more

attractive to the outside investors than the firms with lower credit ratings.

Firms with credit ratings tend to have better access to the external debt capital market than the firms without credit ratings. As firms with credit ratings can have access to the bond market, whereas firms without credit ratings may not have access to the bond market, but only the access to the short-term loans, and hence Mittoo and Zhang (2010) state that firms with credit ratings have higher financial leverage than the firms without ratings, because firms with credit ratings can not only have the access to the short-term loans, but also they can have the access to the bond markets, such as the access to the Eurobond and commercial papers. Moreover, Hovakimian et al (2009) report that firms with credit rating tend to have higher debt ratio than firms without credit rating, as firms with credit rating have access to the external bond market, which has lower cost of borrowing, longer maturity and larger issue size than short-term loan market.

Furthermore, Judge and Korzhenitskaya (2011) argue that firms with access to the public debt market are associated with higher debt ratio than firms without access to the public debt market, and the access to the public debt market is indicated by having a credit rating. Judge and Korzhenitskaya (2011) assert that the positive relationship between the debt ratio and access to the public debt market is the strongest during the period of financial crisis, as firms depend heavily on the bank loans may find themselves severely constrained during a period of limited credit supply, whereas firms with access to the public debt market are able to finance their investment opportunities with alternative source of external funding from the bond market. Other previous studies also claim that firms with credit rating are more levered than firms without credit rating (Faulkender and Petersen, 2005; Judge and Mateus, 2009; Van

Binsbergen and Graham, 2011).

In terms of the firms with credit ratings, firms with higher level of credit rating tend to have better access to the debt capital markets and lower cost of borrowing than firms with lower level of credit rating, and therefore, firms with higher level of credit rating tend to take the advantage of lower cost of borrowing and become more levered than firms with lower level of credit rating. As Tang (2009) states, better rated firms have easier and cheaper access to the bond market, also, these firms often have lower cost of borrowing because of the better credit quality, thus, the better rated firms have higher debt ratio than their lower rated counterparts.

On the other hand, better rated firms are often more flexible while raising external funding via debt capital market compared to lower rated firms, and also, debt contracts are conditional upon minimum levels of credit rating, such as commercial paper. Therefore, better rated firms tend to reduce their financial leverage in order to maintain minimum levels of credit rating, as it would help them to reduce their funding costs (Graham and Harvey, 2001; Kisgen, 2007; Kisgen, 2009). Nevertheless, lower rated firms tend to enhance their financial flexibility by issuing long-term public debts, and they prefer long-term public debts to short-term bank loans, because long-term public debts have less restrictive debt covenants, require less collateralizations, have longer maturities and lower cost of borrowing than short-term bank loans (Rajan and Winton, 1995; Gilson and Warner, 1997). As Mittoo and Zhang (2010) suggest, firms with lower credit ratings are likely to have higher debt ratio than firms with higher credit ratings. They argue that lower rated firms are prone to issue long-term debts to finance their investment opportunities when they have credit ratings, to take the advantage of long-term public debts over the short-term bank loans.

Barclay and Smith (2005) point out that equity finance is the most expensive type of external funding, as it has the largest flotation costs and information costs. Also, as the pecking order theory suggests, firms prefer to finance themselves first with retained earnings, second with external debt, and third with external equity. Furthermore, empirical studies suggest that firms with credit ratings tend to become more levered than firms without credit ratings, as long-term debts have lower funding costs than short-term bank loans and public equity (Hovakimian et al, 2009; Mittoo and Zhang, 2010; Judge and Korzhenitskaya; 2011). I expect that firms with credit ratings are more likely to issue debt and firms without credit ratings are more likely to choose equity. In addition, I expect firms with better credit ratings tend to reduce their financial leverage by issuing equity in order to maintain their minimum levels of credit rating, whereas firms with lower credit ratings are more likely to increase their financial leverage by issuing debt.

Due to the restriction of the sample size, the sample firms having credit ratings are extremely small, and hence I consider the firms with credit ratings and the firms without credit ratings, I intend to find how the credit ratings would affect the firms' decision to conduct debt, equity and dual issues.

Dual issuers share the characteristics of both debt issuers and equity issuers, dual issue is less leverage-increasing than debt issue and more leverage-increasing than equity issue, and therefore, dual issue gives an alternative comparison group other than debt issue and equity issue. In the three regressions, debt issue versus equity issue, debt issue versus dual issue, and dual issue versus equity issue, I expect the signs of the credit rating variable will be similar in

these regressions models. In other words, I expect that rated firms are more likely to issue debt and unrated firms are more likely to issue equity, rated firms are more likely to issue debt and unrated firms are more likely to issue both debt and equity, and rated firms are more likely to issue both debt and equity and unrated firms are more likely to issue equity. The fifth hypothesis is defined as follows.

H_5: Firms without credit ratings are more likely to issue equity and firms with credit ratings are more likely to issue debt.

2.4 Methodology

2.4.1 Data and Variable

The sample is based on the UK public limited firms listed on the FTSE All Share index. The sample period for security issuance of companies is from 2005 to 2011 for a period of 7 years, as the corporate governance data are only available for 7 years. The main sources of data are DataStream and Thomson One Banker. The corporate governance data are manually collected from annual report over the period of 2005 to 2011.

I use two different datasets in my analysis. In the first dataset, it consists of 106 debt issues, 48 equity issues and 13 dual issues between 2005 and 2011, and also, the dependent variable is calculated as the net equity issue or net debt issue to total assets in order to determine if there is a significant amount of equity or debt issue in a particular year. In the second dataset, it comprises of 106 debt issues, 70 equity issues and 13 dual issues, and the dependent variable is measured by seasoned equity issuance in a particular year based on the deals analysis information from Thomson One Banker.

The reason for using the second dataset is because of that it helps to eliminate the potential effects of inclusions of hybrid dependent securities in the first dataset, such as convertible debts or preferred shares that are treated as equity or debt, and however, the convertible debts have the characteristics of debt and the preferred shares have the characteristics of equity. Therefore, the hybrid dependent securities are excluded from the sample in the second dataset because they share the characteristics of both equity and debt issues. In addition, the second dataset helps to differentiate between initial public offerings and seasoned equity offerings, whereas the initial public offerings and seasoned equity offerings are different in terms of the trading volume, market reaction and prior-issue stock return (Derrien and Kecskes, 2007).

The purpose of this study is to investigate the effect of market timing on the security issuance decisions for the firms in the UK using the most recent available data. I used the binary outcome regression and there are three groups of data, which are debt issue, equity issue and dual issue, as these three groups represent similar financing cash inflows.

The security issues of the firms must meet a number of criteria in order to be included in the sample. As suggested by Hovakimian et al (2001), Korajczyk and Levy (2003), Mahajan and Tartaroglu (2008) and Autore and Kovacs (2010), the net equity and debt issuance to the book value of total assets is considered to be significant if it equals or greater than 5%, and hence, it should be included in the sample. Second, although previous studies exclude dual issues from the sample because dual issues may share both the characteristics of equity and debt issuances in the same year (Hovakimian et al, 2001; Dittmar and Thakor, 2007; Autore and Kovacs, 2010), I include dual issues in my sample as a comparison group other than debt issues and

equity issues, as dual issues represent similar cash flows. Third, firms in financial services and utility industries are excluded, because their income measurement and ownership structure are very different from the firms in other industries and some of them are heavily influenced by the government or they are state owned.

The outliers are the extreme values in the data, and the inclusion of the outliers may make the test results not reliable. Therefore, I exclude the outliers from the datasets. The procedure to exclude the outliers for the variables is as follows. First, I list the variables in regular order, with variable names and list of data for each of the variables. Second, I use the summary statistics to summarize the variables, and find out their first quartile and third quartile. Third, I calculate the interquartile range to identify the data that are not regarded as outliers, as Q1 represents the first quartile, Q3 represents the third quartile and k represents the factor value that equals to 1.5, the formula to calculate the range is [Q1-k*(Q3-Q1), Q3+k*(Q3-Q1)]. Fourth, I exclude all the data outside of the range, and only keep the data inside the range, by which I exclude all the values that are considered as the outliers. The methodology I use to exclude the outliers is suggested by Tukey (1977) and Hoaglin et al (1986).

As the dependent variable may be affected by the time-invariant industry-specific effects and firm-invariant time-specific effects, I include both industry dummies and time dummies in my analysis. Ozkan (2001) reports that industry-specific effects may include state of technology, consumer preference, entry barriers and macroeconomic conditions for specific industries, and time-specific effects include economic conditions such as inflation and interest rates.

Table 2.1
Variable Definitions

Variable	Definitions	Source
Dependent Variable		
EQUITY	Probability of equity issue, debt issue or dual equity and debt issue	DataStream
Independent Variables		
Stock Return		
RI	Continuous stock return Log (RI_t / RI_{t-1}), RI represents total return index	DataStream
Market Valuation		
IMB	Book value of total assets minus book value of equity plus market value of equity to book value of total assets minus its industry average value	DataStream
Information Asymmetry		
SIZE	Logarithm of total sales	DataStream
BOD	Sum of directors on board	Annual Report
BODD	1 if board size equals to or less than median value of board size, 0 otherwise	Annual Report
IND	Percentage of sum of independent non-executive directors divided by sum of directors on board	Annual Report
INDD	1 if percentage of independent non-executive directors on board equals to or greater than median value of percentage of independent non-executive directors on board, 0 otherwise	Annual Report
AUD	Percentage of sum of audit committee members divided by sum of directors on board	Annual Report
AUDD	1 if percentage of audit committee members on board equals to or greater than median value of percentage of audit committee members on board, 0 otherwise	Annual Report
AIN	1 if audit committee is independent, 0 otherwise	Annual Report
CEO	1 if CEO is not chairman on board, 0 otherwise	Annual Report
GOV	Sum of corporate governance characteristics dummy variables, including BODD, INDD, AUDD, AIN, CEO	Annual Report
Investment Opportunity		
CAP	Capital expenditure to book value of total assets	DataStream
RD	Research and development expense to total sales	DataStream
Credit Rating		
ACS	1 if firm has a credit rating, 0 if firm does not have a credit rating	DataStream
Control Variables		
ROA	Operating income to book value of total assets	DataStream
TANG	Net property, plant and equipment to book value of total assets	DataStream
HDT	Book value of total debt to book value of total assets minus its two to five years historical average value as a measure of target capital structure	DataStream
IDT	Book value of total debt to book value of total assets minus its industry average value as a measure of target capital structure	DataStream
QCK	Current assets minus inventories to current liabilities	DataStream
INTST	Earnings before interest and tax to interest expense	DataStream
BANK	Major banks prime lending rate	DataStream
RY	Redemption yield of the BofAML corporate bond with all maturities in the UK	DataStream
INDUSTRY	Industry dummy in order to control for industry effects	DataStream
TIME	Time dummy in order to control for time effects	DataStream

Including industry dummies and time dummies controls for the industry-specific effects and time-specific effects. The industry dummies consist of dummy variables for industries including electronic and electrical equipment, building and construction, media, engineering, consumer goods, oil exploration and production, leisure and hotels, general retailers, diversified industrials, support services and extractive industries. The time dummies consist of dummy variables for 2005, 2006, 2007, 2008, 2009 and 2010. Table 2.1 provides a description of the variables that are used in the analysis.

2.4.2 Dependent Variable

The dependent variable represents the debt issue, equity issue or dual issue in a particular year. As suggested by Hovakimian et al (2001) and Autore and Kovacs (2010), the net equity issue and the net debt issue are considered to be significant if the net issue as a percentage of total assets exceeds 5%. For example, if the net equity issue exceeds 5%, the dependent variable equals to 1, on the other hand, if the net debt issue exceeds 5%, the dependent variable equals to 0, and dual issue are the issuer of both debt and equity in the same year.

Net Equity Issue = (Equity Issued –Equity Repurchased) / Total Assets > 5%

Net Debt Issue = (Long-term Borrowings – Reduction in Long-term Debt + Net Change in Short-term Borrowings) / Total Assets > 5%

Nevertheless, one of the limitations is that the calculations for net security issues include the issues of preferred share and convertible debt, which are debt-equity hybrid securities dependent, because for the calculations of proceeds from equity issued and equity redeemed, repurchased and converted, the preferred share and convertible debt are included as one of the

components of equity issuance, also, for the calculations of long-term borrowings and reduction in long-term debt, the preferred share and convertible debt are also included as parts of debt issuance. Another limitation for the calculation of net equity issue is that the issue of equity does not differentiate between IPOs and SEOs. The two limitations mentioned may cause considerations for the subsequent analysis, which are discussed below.

Hovakimian et al (2001) argue that the inclusion of preferred share and convertible debt does not introduce the noise into their analysis, as the results presented with inclusions of preferred share issues and convertible debt issues do not significantly different from the results excluding preferred share issues and convertible debt issues. They assert that high past stock return and recent share price appreciation significantly increase the equity issues, and also they report that firms tend to adjust their capital structure to the target level by issuing or repurchasing equity and debt, and the repurchase decisions play a more important role than issue decisions in the adjustment process of capital structure. Moreover, Auotre and Kovas (2010) do not justify the differences between including hybrid securities and excluding them, and their results are hybrid securities dependent as well.

Nevertheless, there are prior literatures that argue against the inclusion of preferred share and convertible debt in the analysis of equity or debt issuance. Marsh (1982), Dittmar and Thakor (2007), Elliott et al (2008) and DeAngelo et al (2010) exclude preferred share and convertible debt issues from their samples of security issues. As argued by Marsh (1982), preferred share, convertible debt and dual issue in a year share both the characteristics of equity and debt, as preferred share can be converted into common equity, and convertible debt is recognised as equity in the financial statement that can be converted into debt, thus, these characteristics

could possibly introduce the noise into the analysis.

Another consideration is the methodology employed for calculating dependent variable of net equity issue, it does not distinguish between initial public offering and seasoned equity issue. However, as suggested by Derrien and Kecskes (2007), the IPO and SEO are different in several aspects. First, the trading volume of IPO is significantly greater than that of SEO. Second, the market reaction on the offering day is typically negative for SEO, whereas the market reaction for IPO is often positive. Third, SEO experience a large price run up before the issue.

To account for the two issues of dependent variable used in the analysis mentioned above that are the hybrid securities dependent and differences between IPOs and SEOs. Instead of using the first dataset with the method of calculation for dependent variable mentioned above, I utilize another data set, which is directly collected from Thomson One Banker with the deals announcement regarding to the equity issue following IPO, by using this methodology it eliminates the characteristics of both hybrid securities and IPO or SEO, and the study focuses on the issuance of seasoned equity following the IPO.

2.4.3 Control Variables

Previous studies offer a rich source of determinants of the capital structure choices of firms, namely firm characteristics (Titman and Wessels, 1988; Rajan and Zingales, 1995; Alti, 2006; Dittmar and Thakor, 2007). Dittmar and Thakor (2007) point out that firms issue equity are less profitable, more levered and with less tangible assets among others. In the test of hypothesis, I control the independent variables by using a set of different control variables.

Profitability

Profitability is defined as operating income to book value of total assets for the year prior to equity or debt issue. Myers (1984) and Myers and Majluf (1984) suggest that firm finances their investments first from retained earnings, second from debt, and third from equity, the financial hierarchy reflects the costs associated with different financial instruments, as the cost of equity is the most expensive because of information asymmetry problem raising from the information gap between managers and external shareholders. Following the pecking order theory, profitable firms often have low leverage and more retained earnings to finance projects, debt is used as the primary source of external funding when profitability decreases (Titman and Wessels, 1988; Rajan and Zingales, 1995; Fama and French, 2002; Short et al, 2002), equity issues are typically done by firms under financial distress and have difficulties in gaining access of capital markets.

However, Jensen (1986) find that when the corporate control is effective in profitable firms, firms may choose to increase their leverage and use debt as a disciplinary mechanism to prevent managers from pursuing their personal interests to the detriments of outside investors. In addition, Alti (2006) find that cold-market IPO issuers are more profitable than their hot-market counterparts, and less profitable firms find difficult to go public in cold markets. Fama and French (2002) mention that firms issue equity are not under financial duress and 86% of the firms issue equity between 1993 and 2003. Byoun (2008) argues that adverse selection costs are one of the many factors that managers consider when making financing decisions, with the existence of information costs, firms prefer internal fund. Thus, it is more likely that profitable firms issue neither debt nor equity and finance themselves with retained

earnings, firms that are less profitable tend to trade-off between the costs and benefits of external financings and choose whatever that is more favourable and less costly. Profitable firms have more discretion to choose between equity and debt, debt issues are considerably cheaper than equity issues. Therefore, it is expected that profitable firms are more likely to issue debt.

Asset Tangibility

Asset Tangibility is defined as net property, plant and equipment to book value of total assets for the year prior to equity or debt issue. Titman and Wessles (1988) and Rajan and Zingales (1995) find that firms with tangible assets that can be used as collaterals such as property, plant and equipment or land and are relatively stable and long-lived, prefer debt to equity. As managers have better information about firms than outside investors, debt secured by tangible assets reduces agency costs of debt, and hence firms with tangible assets that can be collateralized tend to issue debt. In addition, firms are more constrained on investing in risky project if the debt is secured by collaterals (Rajan and Winton, 1995), and with no collaterals, the debt covenant may be more detailed, restrictive, and favourable to creditors, in turn firms may choose equity instead of debt (Titman and Wessles, 1988). Therefore, it is expected that firms with more tangible assets are more likely to issue debt as opposed to equity.

Target Leverage

As the classical trade-off theory (Kraus and Litzenberger, 1973) suggests, firms maximise firm value by trade-off tax benefits of debt against costs of financial distress. Also, Graham and Harvey (2001) report in their survey that the financial executives tend to issue equity to maintain their target capital structure, especially the firms which are highly levered. As firms

may choose to issue debt or equity depending on whether they deviate from their target capital structure significantly, and therefore, I use two measures of target capital structure in order to examine the relationship between the capital structure and firms' issuance decision, which are historical average debt ratio and industry average debt ratio. As suggested by Hovakimian and Li (2008), Hovakimian et al (2009) and Lyandres (2010), historical average debt ratio uses two to five years historical average value of debt ratio depending on the availability of data, similar methodology has been used in the studies of Marsh (1982), Shyam-Sunder and Myers (1999) and Hovakimian et al (2001). Furthermore, as firms may have different target leverage in addition to the historical average debt ratio, I use the industry average debt ratio as an additional proxy for the target capital structure, which is the average debt ratio across various industries in the sample, other studies has also used industry average debt ratio as an indicator for the target leverage (Hovakimian et al, 2001; Hovakimian and Li, 2008; Lyandres, 2010).

The deviation from the target capital structure in the year prior to the issuance of debt and equity equals to actual debt ratio minus historical average debt ratio or industry average debt ratio, which are represented by two variables that are HDT and IDT. Therefore, it is expected that over-levered firms tend to issue equity and under-levered firms tend to issue debt.

Liquidity

Liquidity is defined as current assets subtracted by inventories to current liabilities for the year prior to equity or debt issue. Quick ratio measures that firm's ability to use its liquid assets to meet their short-term debt obligations, firms with less liquidity ratio may find to be more difficult to borrow short-term private debt or bank loan and may therefore choose to issue equity (Bharath et al, 2009). Therefore, it is expected that firms that are less liquid are

more likely to issue equity.

Interest Coverage

Interest coverage is defined as earning before interests and tax to interest expense for the year prior to equity or debt issue. Welch (2004) asserts operating income may be the best measures of liquid assets and tax advantage, and immediate interest payment may be the best measure of companies' liquidity and bankruptcy risk, and hence trade-off theory may be better tested on the interest coverage ratio. Also, he reports that managers pay attention on the their firms' credit ratings, which are in turn highly correlated with interest coverage ratio. Moreover, Barry et al (2009) find that interest coverage ratio has positive effect on the firms' debt issuance, as the higher the interest coverage, the more likely the firms will issue debt. Therefore, it is expected that firms with greater interest coverage may serve debt interests more easily, and hence are able to raise external debt more quickly among other firms.

Short-term Loan Rate

Short-term loan rate represents the UK major banks' prime lending rate for the year prior to equity or debt issue. Debt issuances may comprised of long-term debts and short-term debts, short-term debt issues are almost regularly for the firms as the costs associated with short-term debt issues are the least among other alternative possible sources of external financing. Barry et al (2008) and Barry et al (2009) announce that both current and past levels of interest rates are significantly associated with short-term debt issuance. Antoniou et al (2009) find that debt issuances are primarily driven by the debt market conditions. Therefore, it is expected that firms are more likely to issue short-term debt after declines in short-term lending rates.

Corporate Bond Rate

Corporate bond rate represents redemption yield of corporate bond with all maturities in the UK for the year prior to equity or debt issue. Graham and Harvey (2002) find that firms routinely time the debt market and issue debt when the interest rate is low relative to recent historical rates. Barry et al (2009) find that firms may prefer debt over equity after recent declines in interest rates to reduce their cost of debt. Also, they argue if the interest rates are expected to fall, firms prefer to issue floating rate debt rather than "locking" a fixed rate debt, on the other hand, if the interest rates are expected to rise in the future, firms prefer to lock the interest rate by issuing fixed rate debt. In addition, Autore and Kovacs (2010) use 10-year AAA rated corporate bond rate as an index for the debt capital market condition, they predict that firms are more likely to issue long-term debt rather than equity after recent declines in corporate bond interest rates. Nonetheless, Leary (2009) argues that the supply effect of debt is more prevalent in explaining why firms issue debt, he reports that if the firms anticipate a tight money situation, they will go ahead for debt financing even though the debt interest rate is at a historical high.

2.4.4 Summary Statistics

Table 2.2 describes the summary statistics of the sample firms from 2005 to 2011. The sample firms consist of debt issuers, equity issuers and dual issuers. In the first dataset, it comprises of 106 debt issuers, 48 equity issuers and 13 dual issuers during the sample period, and in the second dataset, it comprises of 106 debt issuers, 70 equity issuers and 13 dual issuers. It should be noticed that the amount of dual issues is significantly lower than the amounts of debt issues and equity issues, whereas Hovakimian et al (2004) find that the amount of dual

issues is fairly large, and the amount of dual issues in their sample is about 81% of total equity issues and 17% of total debt issues.

In comparison between the equity issuers and debt issuers, on average the equity issuers have lower stock return and industry adjusted market to book ratio than the debt issuers, therefore, from summary statistics there is no evidence that firms successfully time the equity market as what previously suggested. In terms of the measurements for the information asymmetry, I find that equity issuers tend to be larger in size and have better corporate governance quality than debt issuers, which provide supports that equity issuers tend to issue equity when their information asymmetry is low. The average values for the capital expenditure and research and development expense as proxies for the investment opportunities are similar in both datasets, except that in the second dataset, the capital expenditure for debt issuers is slightly higher than the capital expenditure for equity issuers, which implies that firms prefer to finance their investment opportunities with debt rather than equity. As dual issues are less leverage-increasing than debt issues and more leverage-increasing than equity issues, and dual issues share the characteristics of both debt issues and equity issues, and therefore, I expect that the average values of the variables for dual issues are between the average values for the debt and equity issues, in the summary statistics, I can not find such evidence, the sample size is small for dual issues and the statistics for dual issues may only represent the small sample.

Table 2.2
Summary Statistics

Summary Statistics for Dataset 1												
	Debt Issues = 106 Obs.				Equity Issues = 48 Obs.				Dual Issues = 13 Obs.			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
RI	0.08	0.18	-0.68	0.66	-0.14	0.26	-0.79	0.27	0.10	0.10	-0.11	0.25
IMB	0.00	0.93	-2.03	2.21	-0.32	0.88	-1.61	2.63	0.35	1.22	-1.57	2.62
SIZE	5.87	0.63	4.42	7.25	6.00	0.66	4.62	7.46	5.46	0.53	4.36	6.27
BOD	8.17	2.12	4.00	16.00	8.44	2.17	5.00	15.00	6.77	1.88	5.00	11.00
IND	0.51	0.14	0.00	0. 83	0.53	0.12	0.33	0.83	0.49	0.11	0.33	0.63
AUD	0.41	0.13	0.00	0.71	0.41	0.09	0.22	0.60	0.49	0.13	0.33	0.83
AIN	0.87	0.34	0.00	1.00	0.96	0.20	0.00	1.00	0.69	0.48	0.00	1.00
CEO	1.00	0.00	1.00	1.00	0.98	0.14	0.00	1.00	1.00	0.00	1.00	1.00
GOV	3.63	1.08	1.00	5.00	3.67	1.04	2.00	5.00	3.92	1.04	2.00	5.00
CAP	0.05	0.03	0.00	0.15	0.05	0.03	0.00	0.12	0.04	0.03	0.00	0.11
RD	0.01	0.02	0.00	0.07	0.01	0.02	0.00	0.11	0.03	0.05	0.00	0.16
ACS	0.13	0.34	0.00	1.00	0.15	0.36	0.00	1.00	0.00	0.00	0.00	0.00
ROA	0.08	0.04	-0.06	0.22	0.03	0.06	-0.10	0.20	0.08	0.04	0.01	0.16
TANG	0.29	0.24	0.00	0.93	0.25	0.20	0.00	0.82	0.19	0.15	0.01	0.49
HDT	-0.01	0.06	-0.16	0.16	0.04	0.06	-0.09	0.19	-0.03	0.07	-0.20	0.07
IDT	0.02	0.13	-0.23	0.33	0.10	0.13	-0.17	0.40	0.03	0.10	-0.18	0.17
QCK	0.78	0.40	0.07	2.17	0.76	0.41	0.14	2.04	0.93	0.25	0.46	1.51
INTST	9.60	9.39	-3.65	43.96	2.57	5.27	-9.81	18.5	7.56	3.98	0.91	15.94
BANK	4.94	1.93	1.50	6.50	3.44	1.79	1.50	6.50	5.23	1.69	1.50	6.50
RY	5.86	1.10	4.93	8.86	6.70	1.46	4.93	8.86	5.58	1.05	4.93	8.86
Summary Statistics for Dataset 2												
	Debt Issues = 106 Obs.				Equity Issues = 70 Obs.				Dual Issues = 13 Obs.			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
RI	0.08	0.18	-0.68	0.66	-0.04	0.29	-0.72	1.13	0.07	0.12	-0.17	0.23
IMB	0.06	0.95	-2.03	2.62	-0.18	0.90	-1.68	2.63	-0.11	1.10	-1.94	2.02
SIZE	5.81	0.63	4.42	7.25	5.93	0.61	4.62	7.22	5.89	0.69	4.36	7.05
BOD	8.00	2.14	4.00	16.00	8.34	2.23	5.00	16.00	8.15	2.08	5.00	11.00
IND	0.51	0.14	0.00	0. 83	0.54	0.12	0.33	0.80	0.51	0.08	0.33	0.60
AUD	0.43	0.13	0.00	0. 83	0.42	0.10	0.20	0.67	0.38	0.10	0.22	0.60
AIN	0.84	0.37	0.00	1.00	0.91	0.28	0.00	1.00	0.92	0.28	0.00	1.00
CEO	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
GOV	3.56	1.04	1.00	5.00	3.59	1.11	1.00	5.00	3.31	0.95	2.00	5.00
CAP	0.05	0.03	0.00	0.15	0.04	0.03	0.00	0.12	0.05	0.04	0.00	0.12
RD	0.01	0.02	0.00	0.07	0.01	0.02	0.00	0.11	0.02	0.05	0.00	0.16
ACS	0.12	0.32	0.00	1.00	0.13	0.34	0.00	1.00	0.08	0.28	0.00	1.00
ROA	0.08	0.04	-0.05	0.22	0.05	0.05	-0.08	0.20	0.07	0.04	-0.02	0.16
TANG	0.29	0.24	0.00	0.93	0.20	0.18	0.00	0.82	0.18	0.16	0.01	0.49
HDT	-0.01	0.06	-0.16	0.16	0.02	0.06	-0.09	0.23	-0.02	0.06	-0.20	0.05
IDT	0.02	0.13	-0.23	0.33	0.03	0.14	-0.28	0.33	0.02	0.13	-0.18	0.28
QCK	0.78	0.40	0.07	2.17	0.80	0.39	0.03	2.04	0.91	0.30	0.31	1.51
INTST	9.38	9.15	-3.65	43.96	6.15	9.23	-18.67	42.67	9.31	7.68	0.54	27.93
BANK	5.05	1.87	1.50	6.50	3.32	1.71	1.50	6.50	4.35	2.15	1.50	6.50
RY	5.80	1.07	4.93	8.86	6.34	1.10	4.93	8.86	6.03	1.33	4.93	8.86

The summary statistics for the firm characteristics show that on average debt issuers are more profitable, have more tangible assets, higher interest coverage ratio and lower long-term debt interest rate than equity issuers. As can be seen from the mean value for HDT and IDT, which

are the deviations from historical average debt ratio and industry average debt ratio, firms that are below the historical or industry average debt ratio tend to issue debt, and firms that are above the historical or industry average debt ratio tend to issue equity, which provide evidence that there is a target capital structure and firms tend to issue debt and equity to adjust their capital structure back to their target levels.

2.4.5 Model Specification

I perform a Wilcoxon-Mann-Whitney test to represent the univariate test results and different from the regressions, the Wilcoxon-Mann-Whitney test is a non-parametric test, which does not depend on the classical assumptions of linear regressions, such as heteroscedasticity and multicollinearity.

Following the univariate test, I conduct a correlation analysis for the correlations between independent variables to examine if there are pairs of highly correlated independent variables to eliminate the problems of multicollinearity that may distort the regression results.

Having conducted a correlation analysis, in consistent with the prior studies in examining equity and debt issuances, I use logistic regressions that is consistent with the previous studies (Marsh, 1982; Hovakimian et al, 2001; Dittmar and Thakor, 2007; Barry et al, 2009; Autore and Kovacs, 2010; DeAngelo et al, 2010). I control for the problem of heteroscedasticity by using logistic regressions with robust standard errors in the analysis. All the independent variables are lagged for one year prior to debt, equity or dual issue.

$$EQUITY_{i,t} = \beta_0 + \beta_1 RI_{i,t-1} + \beta_2 IMB_{i,t-1} + \beta_3 SIZE_{i,t-1} + \beta_4 GOV_{i,t-1} + \beta_5 CAP_{i,t-1} + \beta_6 RD_{i,t-1} + \beta_7 ACS_{i,t-1} + \beta_8 ROA_{i,t-1} + \beta_9 TANG_{i,t-1} + \beta_{10} HDT_{i,t-1} + \beta_{11} IDT_{i,t-1} + \beta_{12} QCK_{i,t-1} + \beta_{13} INTST_{i,t-1} + \beta_{14} BANK_{i,t-1} + \beta_{15} RY_{i,t-1} + \beta_{16} INDUSTRY_{i,t-1} + \beta_{17} TIME_{i,t-1} + \varepsilon_{i,t} \quad (2.1)$$

$$EQUITY_{i,t} = \beta_0 + \beta_1 RI_{i,t-1} + \beta_2 IMB_{i,t-1} + \beta_3 SIZE_{i,t-1} + \beta_4 BOD_{i,t-1} + \beta_5 IND_{i,t-1} + \beta_6 AUD_{i,t-1} + \beta_7 AIN_{i,t-1} + \beta_8 CEO_{i,t-1} + \beta_9 CAP_{i,t-1} + \beta_{10} RD_{i,t-1} + \beta_{11} ACS_{i,t-1} + \beta_{12} ROA_{i,t-1} + \beta_{13} TANG_{i,t-1} + \beta_{14} HDT_{i,t-1} + \beta_{15} IDT_{i,t-1} + \beta_{16} QCK_{i,t-1} + \beta_{17} INTST_{i,t-1} + \beta_{18} BANK_{i,t-1} + \beta_{19} RY_{i,t-1} + \beta_{20} INDUSTRY_{i,t-1} + \beta_{21} TIME_{i,t-1} + \varepsilon_{i,t} \quad (2.2)$$

In order to examine the potential effect of the financial crisis and to check whether the parameters are stable over time, I split the initial sample into two sub samples for the periods between 2005 and 2007, and between 2008 and 2011, in order to test for the differences in the results before and during the financial crisis in 2008.

2.5 Results and Discussions

2.5.1 Univariate Results

Table 2.3 below presents Wilcoxon-Mann-Whitney test for the first datasets. In comparison with t-test, which is a mean difference test, Wilcoxon-Mann-Whitney test is a non-parametric test that compares the median difference between two groups of data, which does not assume the data is normally distributed. As the sample size is small, especially for the dual issues, getting a normal distribution is unlikely and hence, Wilcoxon-Mann-Whitney test for the median comparison of two groups of data is more suitable for the sample than the t-test for mean difference of two groups of data in the sample.

In the median comparison between independent variables of three sample groups, including debt issues, equity issues and dual issues, over the period of 2005 to 2011, equity issuers tend to have lower prior issue stock return, lower industry-adjusted market to book ratio, lower profitability, higher leverage, lower interest coverage ratio, lower short-term interest rate and higher long-term interest rate than debt issuers. Also, dual issuers tend to be smaller in firm size and board size, and have higher growth opportunities and quick ratio than debt issuers.

Table 2.3
Wilcoxon-Mann-Whitney Test for Dataset 1

Wilcoxon-Mann-Whitney Test for Dataset 1 between 2005 and 2011			
	Debt Issues	Equity Issues	Dual Issues
RI	0.10	-0.13***	0.09
IMB	-0.09	-0.55**	0.05
SIZE	5.83	5.84	5.44**
BOD	8.00	8.00	6.00**
IND	0.56	0.52	0.50
AUD	0.43	0.42	0.50
AIN	1.00	1.00	1.00
CEO	1.00	1.00	1.00
GOV	3.00	3.00	4.00
CAP	0.04	0.04	0.05
RD	0.00	0.00	0.01***
ACS	0.00	0.00	0.00
ROA	0.08	0.04***	0.07
TANG	0.24	0.20	0.16
HDT	-0.01	0.03***	-0.03
IDT	0.00	0.11***	0.04
QCK	0.73	0.70	0.95*
INTST	6.56	2.41***	6.78
BANK	6.00	3.00***	6.00
RY	5.72	6.18***	5.39
Observations	106	48	13

Significantly different from the value for debt issues at 1% (***), 5% (**) and 10% (*) respectively.

(Table 2.3 continued)

Wilcoxon-Mann-Whitney Test for Dataset 1 between 2005 and 2007			
	Debt Issues	Equity Issues	Dual Issues
RI	0.11	0.10	0.08
IMB	-0.11	-0.12	-0.10
SIZE	5.86	5.89	5.26**
BOD	8.00	8.00	6.00***
IND	0.54	0.45	0.50
AUD	0.42	0.38	0.50
AIN	1.00	1.00	1.00
CEO	1.00	1.00	1.00
GOV	3.00	3.00	4.00
CAP	0.05	0.04	0.05
RD	0.00	0.00	0.03***
ACS	0.00	0.00	0.00
ROA	0.07	0.07	0.07
TANG	0.30	0.13*	0.16**
HDT	-0.01	-0.01	-0.03
IDT	0.05	0.09	0.04
QCK	0.69	0.80	0.98**
INTST	6.89	6.36	7.85
BANK	6.00	6.00	6.00
RY	4.93	4.93	4.93
Observations	45	10	9
Wilcoxon-Mann-Whitney Test for Dataset 1 between 2008 and 2011			
	Debt Issues	Equity Issues	Dual Issues
RI	0.07	-0.17***	0.16
IMB	-0.03	-0.60**	1.57*
SIZE	5.77	5.83	5.81
BOD	8.00	8.00	7.50
IND	0.56	0.55	0.56
AUD	0.43	0.43	0.48
AIN	1.00	1.00	1.00
CEO	1.00	1.00	1.00
GOV	4.00	4.00	4.50
CAP	0.03	0.04	0.03
RD	0.00	0.00	0.00
ACS	0.00	0.00	0.00
ROA	0.08	0.03***	0.06
TANG	0.20	0.23	0.25
HDT	-0.01	0.04***	0.00
IDT	-0.01	0.12***	0.04
QCK	0.77	0.67	0.86
INTST	6.56	1.99***	5.97
BANK	6.50	3.00**	4.00
RY	5.72	6.18***	5.88
Observations	61	38	4

Significantly different from the value for debt issues at 1% (***), 5% (**) and 10% (*) respectively.

In line with pecking order hypothesis, the non-parametric results indicate that equity issuers are more likely to be financial constraint firms with less stock returns, undervalued, less profitable and have lower interest coverage ratio, which is consistent with the capital structure

literatures that debt issuers are better regarding to their operating performances and firms prefer debt to equity for their corporate investments. Interestingly, the results provide support for the trade-off theory that over-levered firms tend to issue equity and under-levered firms tend to issue debt, as the firms have target levels of capital structure and tend to trade-off between the costs and benefits associated with debt.

Interestingly, I find if firms experience significant research and development expense in the year before, the firms are more likely to issue both debt and equity to finance their research and development costs than debt issues. However, I find that firm size and board size provide contradictory results. Firm size is an inverse proxy of information asymmetry, whereas board size is a positive proxy of information asymmetry as firms with smaller board are often more efficient in board communication and cooperation indicating good corporate governance quality (Jensen and Meckling, 1976, Huyghebaert and Wang, 2012), and therefore, they are assumed to have lower information asymmetry. The results reveal that dual issuers tend to have higher information asymmetry than debt issuers as indicated by firm size, and lower information asymmetry as indicated by board size. One of the reasons is that the number of dual issuers in the UK is quite low, resulting in a low variation of the independent variable.

In addition, over the period of 2005 to 2007, I find that equity issuers have lower tangibility ratio than debt issuers, the tangibility ratio of dual issuers is lower than debt issuers but higher than equity issuers, which is consistent with the prediction. Firms with more tangible assets that can be used as collaterals are able to issue more debt. Also, due to information asymmetry between managers and shareholders, debt secured by tangible assets reduces the agency costs, and hence firms with tangible assets tend to issue debt from the governance point of view.

Therefore, firms with more tangible assets are likely to issue debt as opposed to equity issue. As dual issue is less leverage-increasing than debt issue and more leverage-increasing than equity issue, one could expect dual issuers have less tangible assets than debt issuers, but more tangible assets than equity issuers. Over the period of 2008 to 2011, I find that equity issuers have lower prior issue stock return, lower industry-adjusted market to book ratio, lower profitability, higher leverage, lower interest coverage ratio, lower short-term interest rate and higher long-term interest rate than debt issuers. More importantly, the lower stock return, industry-adjusted market to book ratio, profitability and interest coverage ratios of equity issuers are primarily driven by the sample firms from 2008 to 2011 rather than from 2005 to 2007, which provide supports that firms issue equity under financial distress. Also, consistent with the previous results, I find that over-levered firms are more likely issue equity and under-levered firms are more likely to issue debt.

Table 2.4
Wilcoxon-Mann-Whitney Test for Dataset 2

Wilcoxon-Mann-Whitney Test for Dataset 2 between 2005 and 2011			
	Debt Issues	Equity Issues	Dual Issues
RI	0.10	-0.04***	0.08
IMB	-0.08	-0.45*	0.09
SIZE	5.80	5.85	5.86
BOD	8.00	8.00	9.00
IND	0.55	0.56	0.55
AUD	0.43	0.43	0.33
AIN	1.00	1.00	1.00
CEO	1.00	1.00	1.00
GOV	4.00	3.00	3.00
CAP	0.04	0.04	0.05
RD	0.00	0.00	0.00
ACS	0.00	0.00	0.00
ROA	0.08	0.05***	0.07
TANG	0.24	0.18***	0.14
HDT	-0.01	0.01**	-0.02
IDT	0.01	0.05	0.04
QCK	0.74	0.77	0.97
INTST	6.69	3.97***	6.56
BANK	6.00	3.00***	5.50
RY	5.72	6.18***	5.72
Observations	106	70	13

Significantly different from the value for debt issues at 1% (***), 5% (**) and 10% (*) respectively.

(Table 2.4 continued)

Wilcoxon-Mann-Whitney Test for Dataset 2 between 2005 and 2007			
	Debt Issues	Equity Issues	Dual Issues
RI	0.11	0.15	0.10
IMB	-0.11	0.22	-0.13
SIZE	5.83	6.02	5.76
BOD	8.00	8.00	6.50
IND	0.52	0.46	0.52
AUD	0.43	0.38	0.37
AIN	1.00	1.00	1.00
CEO	1.00	1.00	1.00
GOV	3.00	3.00	3.00
CAP	0.05	0.03	0.05
RD	0.00	0.00	0.00
ACS	0.00	0.00	0.00
ROA	0.07	0.08	0.08
TANG	0.30	0.10*	0.14**
HDT	-0.01	-0.02	-0.01
IDT	0.05	-0.05	0.05
QCK	0.70	0.79	1.04*
INTST	6.93	6.17	8.66
BANK	6.00	6.00	5.75
RY	4.93	4.93	5.16
Observations	48	10	6
Wilcoxon-Mann-Whitney Test for Dataset 2 between 2008 and 2011			
	Debt Issues	Equity Issues	Dual Issues
RI	0.09	-0.08***	0.05
IMB	-0.02	-0.54**	0.09
SIZE	5.77	5.83	5.86
BOD	8.00	8.00	9.00
IND	0.56	0.57	0.56
AUD	0.44	0.44	0.33
AIN	1.00	1.00	1.00
CEO	1.00	1.00	1.00
GOV	4.00	4.00	3.00
CAP	0.03	0.04	0.05
RD	0.00	0.00	0.00
ACS	0.00	0.00	0.00
ROA	0.08	0.05***	0.06
TANG	0.20	0.19	0.17
HDT	-0.01	0.02**	-0.02
IDT	-0.01	0.05*	-0.01
QCK	0.76	0.76	0.94
INTST	6.61	3.89***	5.27
BANK	6.50	3.00***	1.50
RY	5.72	6.18***	6.04
Observations	58	60	7

Significantly different from the value for debt issues at 1% (***), 5% (**) and 10% (*) respectively.

Table 2.4 presents the results of Wilcoxon-Mann-Whitney test using an alternative measure of equity issue, which is the seasoned equity issues extracted from Thomson One Banker database. The results are virtually the same as the results shown in table 2.3, except for the

sample period between 2005 and 2011, I find additional evidence that firms with more tangible assets are more likely to issue debt as opposed to equity issue.

2.5.2 Correlation Analysis

Judge et al (1988) state that correlations between two independent variables that are above 0.8 are regarded as multicollinearity. Multicollinearity problems may affect the coefficients of independent variables and it even may change their signs, and also, multicollinearity problems may result in insignificant results when the independent variables are actually significant. In order to test for the correlation between independent variables and account for the potential problems of multicollinearity, I conduct correlation analyses for the independent variables of the two samples from DataStream and Thomson One Banker respectively. I implement a stricter threshold and regard the correlations of 0.5 as significant correlations to make the test results more reliable rather than the threshold of 0.8 as suggested by Judge et al (1988). As I use Stata to run the regressions, Stata software also detects the multicollinearity problems automatically while running the regressions, and it excludes the variables that are highly correlated with each another during the regression analyses.

Table 2.4 presents the correlation matrix of the independent variables used in the analysis. In the table, I point out significant correlations between independent variables that are above the threshold of 0.5. For instance, there is a significant positive correlation between *BOD* and *SIZE*, indicating that bigger firms have larger board size. Positive correlations between *GOV* and *IND*, and between *GOV* and *AUD* show that firms have higher percentage of independent non-executive directors and audit committee members on board tend to have better corporate governance quality. There are also significant positive correlations between *INTST* and *ROA*,

BANK and *RI*, and significant negative relationships between *RY* and *RI*, *RY* and *BANK*.

The methodologies that are used to address the problems of multicollinearity are to combine the two highly correlated variables or to drop one of the two variables. Therefore, I drop *BOD*, *INTST*, *BANK* and *RY* in the regressions. It should be noted that *GOV* is significantly correlated with *IND* as well as *AUD*, however, *GOV* variable is derived from *IND* and *AUD*, and *GOV* will not be included in the same regression of *IND* and *AUD*, so it is not necessary to exclude each of these variables.

Table 2.5
Correlation Matrix of Independent Variables

Correlation Matrix of Independent Variables of Dataset 1																			
	RI	*IMB*	*SIZE*	*BOD*	*IND*	*AUD*	*AIN*	*CEO*	*GOV*	*CAP*	*RD*	*ACS*	*ROA*	*TANG*	*HDT*	*IDT*	*QCK*	*INTST*	*BANK*	*RY*
RI	1.00																			
IMB	0.37	1.00																		
SIZE	0.02	-0.04	1.00																	
BOD	-0.03	0.00	0.65*	1.00																
IND	-0.12	-0.13	0.32	0.18	1.00															
AUD	0.02	-0.04	-0.08	-0.28	0.40	1.00														
AIN	-0.13	-0.06	0.15	0.20	0.41	0.01	1.00													
CEO	0.11	0.07	0.05	0.04	0.05	-0.01	-0.03	1.00												
GOV	0.01	0.01	-0.13	-0.43	0.54*	0.58*	0.41	0.05	1.00											
CAP	0.05	0.06	0.05	0.05	0.03	-0.04	-0.08	0.11	-0.05	1.00										
RD	-0.07	0.01	-0.22	-0.06	-0.01	0.12	0.01	0.03	0.10	-0.03	1.00									
ACS	0.15	0.16	0.32	0.30	-0.03	-0.09	-0.08	0.03	-0.27	0.13	-0.13	1.00								
ROA	0.48	0.44	-0.07	-0.06	-0.06	-0.06	-0.12	0.24	-0.02	0.13	-0.06	0.04	1.00							
TANG	0.05	-0.06	0.05	0.16	0.01	-0.10	-0.11	0.09	-0.18	0.50	-0.15	0.28	0.11	1.00						
HDT	-0.21	-0.14	0.19	0.21	0.10	0.01	0.01	-0.14	-0.03	0.08	-0.07	0.01	-0.28	0.17	1.00					
IDT	-0.05	0.09	0.07	0.06	0.04	0.06	-0.01	-0.07	-0.02	0.24	-0.05	0.18	-0.11	0.35	0.37	1.00				
QCK	0.14	0.20	-0.15	-0.14	0.01	0.06	-0.02	0.13	0.05	0.34	0.29	-0.01	0.11	-0.01	-0.08	0.10	1.00			
INTST	0.30	0.28	-0.12	-0.05	-0.06	-0.04	0.04	0.11	-0.01	-0.17	-0.07	-0.03	0.53*	-0.20	-0.27	-0.47	-0.03	1.00		
BANK	0.52*	0.18	0.08	0.03	-0.10	0.02	-0.15	0.12	-0.11	0.02	0.05	0.09	0.41	0.03	-0.20	-0.01	0.05	0.11	1.00	
RY	-0.66*	-0.14	-0.09	0.07	0.11	-0.03	0.16	-0.17	0.06	-0.05	0.04	-0.10	-0.39	-0.07	0.22	0.01	-0.00	-0.14	-0.78*	1.00

Correlation values of independent variables that are greater than 0.50 are denoted as *.

(Table 2.5 continued)

Correlation Matrix of Independent Variables of Dataset 2

	RI	*IMB*	*SIZE*	*BOD*	*IND*	*AUD*	*AIN*	*CEO*	*GOV*	*CAP*	*RD*	*ACS*	*ROA*	*TANG*	*HDT*	*IDT*	*QCK*	*INTST*	*BANK*	*RY*
RI	1.00																			
IMB	0.28	1.00																		
SIZE	0.00	-0.05	1.00																	
BOD	-0.08	0.03	0.64*	1.00																
IND	-0.09	-0.13	0.33	0.19	1.00															
AUD	0.08	-0.07	-0.12	-0.33	0.39	1.00														
AIN	-0.14	-0.05	0.12	0.15	0.40	0.01	1.00													
CEO	-0.05	-0.04	0.15	0.10	0.00	-0.00	-0.05	1.00												
GOV	0.06	-0.06	-0.16	-0.46	0.55*	0.60*	0.41	0.02	1.00											
CAP	0.08	0.04	0.02	-0.02	0.02	-0.01	-0.12	0.00	-0.02	1.00										
RD	-0.02	0.02	-0.16	0.01	0.03	0.05	-0.04	-0.26	0.03	-0.01	1.00									
ACS	0.08	0.17	0.31	0.34	-0.03	-0.15	-0.10	0.04	-0.30	0.05	-0.06	1.00								
ROA	0.26	0.35	-0.06	-0.06	-0.12	-0.11	-0.11	-0.05	-0.06	0.12	-0.02	-0.01	1.00							
TANG	-0.00	-0.10	0.03	0.10	0.03	-0.08	-0.09	-0.07	-0.11	0.50	-0.14	0.22	0.07	1.00						
HDT	-0.11	-0.12	0.13	0.14	0.07	0.01	-0.07	0.33	-0.06	0.08	-0.05	-0.00	-0.19	0.14	1.00					
IDT	0.10	0.11	0.04	0.01	0.03	0.08	-0.06	0.12	-0.03	0.21	-0.03	0.17	0.00	0.35	0.33	1.00				
QCK	0.12	0.20	-0.15	-0.16	0.03	0.12	-0.01	-0.18	0.09	0.33	0.26	0.00	0.05	-0.00	-0.05	0.15	1.00			
INTST	0.10	0.16	-0.10	-0.06	-0.10	-0.03	0.06	0.10	-0.02	-0.18	-0.08	-0.08	0.46	-0.25	-0.24	-0.45	-0.06	1.00		
BANK	0.36	0.17	0.06	0.01	-0.08	0.04	-0.15	-0.11	-0.06	0.08	0.08	0.03	0.30	0.10	-0.07	0.07	-0.01	-0.02	1.00	
RY	-0.57*	-0.09	-0.05	0.13	0.08	-0.11	0.16	0.09	-0.05	-0.07	-0.02	0.01	-0.25	-0.08	0.08	-0.13	0.06	0.01	-0.71*	1.00

Correlation values of independent variables that are greater than 0.50 are denoted as *.

2.5.3 Logistic Analysis on Net Equity or Debt Issues

Table 2.5 displays the multivariate results using net changes in equity or debt issues as dependent variable. Model 1 tests for the relationship between market timing variables and security issuance over the period of 2005 to 2011. The R square of model 1 is 56.3%, which implies that 56.3% of the variability of the security issues can be explained by the explanatory variables as a whole. In consistent with the test results in summary statistics and Wilcoxon-Mann-Whitney tests, I find that the firms issue equity are more likely to have lower stock returns as opposed to debt issuers. The result is inconsistent with the result as suggested by Hovakimian et al (2001), who find the common stock and convertible debt issuers experience very good stock returns throughout the year of issue and the year prior to the issue, and the negative coefficients on RI show that firms experience negative stock returns in the year prior to equity issue.

The coefficients of logistic regressions does not give the economic meanings of explanatory variables, and therefore, I use average marginal effects (AMEs) as the measure of independent variable's probability and report them in the table, the p-values are reported in the parentheses. Marginal effects of logistic regressions show how much the probability of the outcome variable changes with one unit change in values of respective independent variables, while holding other variables constant. For example, the marginal effect of RI shows that one unit decrease in stock return increases the probability of equity issue versus debt issue by 44.7%, which can be interpreted that if the stock return of a sample firm decrease by 10% in the year before, this firm are 4.5% more likely to issue equity rather than debt.

Table 2.6
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Index

Independent Variables	Debt Issues vs. Equity Issues (1)	AMEs	Debt Issues vs. Dual Issues (2)	AMEs	Dual Issues vs. Equity Issues (3)	AMEs
Dependent Variable: *EQUITY*						
RI	-5.234**	-0.447**	-2.678	-0.156	-7.652**	-0.647**
	(0.020)	(0.018)	(0.549)	(0.545)	(0.029)	(0.021)
IMB	0.158	0.014	1.261***	0.073***	-0.010	-0.001
	(0.671)	(0.668)	(0.008)	(0.007)	(0.991)	(0.991)
SIZE	-0.615	-0.053	-1.504*	-0.087**	1.361	0.115
	(0.284)	(0.282)	(0.092)	(0.050)	(0.365)	(0.387)
GOV	-0.469	-0.040	0.631	0.037	-0.318	-0.027
	(0.181)	(0.170)	(0.123)	(0.172)	(0.566)	(0.551)
CAP	0.866	0.074	5.628	0.327	-0.115	-0.010
	(0.946)	(0.946)	(0.845)	(0.844)	(0.995)	(0.995)
RD	51.766*	4.419*	76.058**	4.420**	-9.553	-0.807
	(0.077)	(0.061)	(0.017)	(0.015)	(0.751)	(0.746)
ACS	1.130	0.096				
	(0.289)	(0.290)				
ROA	-22.555***	-1.926***	3.450	0.201	-5.450	-0.460
	(0.007)	(0.004)	(0.747)	(0.743)	(0.628)	(0.639)
TANG	-7.967***	-0.680***	-4.837	-0.281	1.425	0.120
	(0.001)	(0.001)	(0.245)	(0.194)	(0.644)	(0.665)
HDT	4.870	0.416	-1.735	-0.101	11.831	1.000
	(0.298)	(0.297)	(0.883)	(0.884)	(0.269)	(0.210)
IDT	12.483***	1.066***	7.659*	0.445*	-0.232	-0.020
	(0.000)	(0.000)	(0.083)	(0.096)	(0.954)	(0.954)
QCK	0.144	0.012	-1.498	-0.087	-0.040	-0.003
	(0.900)	(0.900)	(0.334)	(0.356)	(0.988)	(0.988)
Constant	-0.701		0.094		-4.773	
	(0.858)		(0.989)		(0.645)	
Pseudo R^2	0.563		0.455		0.467	
DV = 0	106		106		13	
DV = 1	48		13		48	
Obs.	154		119		61	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

In addition, firms are more likely to issue equity when they experience higher research and development expense in the year prior to the issue as opposed to issuing debt. Specifically, I find that if the research and development expense of a firm is 10% higher than another firm, this firm is 44.2% more likely to issue equity. The result is consistent with the argument that firms tend to issue equity to finance their growth opportunities and equity are not only issued under the financial distress (Gatchev et al, 2009; Morellec and Schurhoff, 2011). This is also

in line with the underinvestment that firms tend to maintain lower debt ratio when they have higher growth opportunities, as taking too much debt firms would pass up valuable growth opportunities. Research and development expense may include advertising costs and research costs. However, I did not find that capital expenditure, such as mergers and acquisitions affect the choice between equity and debt.

The negative coefficients on profitability and asset tangibility are consistent with the prediction. Firms that are more profitable tend to issue debt, which is consistent with pecking order theory that debt is used as a primary source of external financing, profitable firms tend to finance their investment first with retained earnings, second with debt and third with equity, and equity is typically issued by firms under financial distress. Moreover, firms with higher amount of tangible assets in their asset composition are more likely to issue debt rather than equity. As firms with more tangible assets are better able to secure their debts with collaterals, and by issuing debt secured with collaterals, it would reduce the agency costs as managers are more constrained in investing in risky projects (Rajan and Winton, 1995).

Furthermore, using industry average debt ratio as a proxy for target capital structure, I find that over-levered firms are more likely to issue equity and under-levered firms are more likely to issue debt, which is consistent with the trade-off theory that firms have target capital structure and trade-off between the costs and benefits of debt in order to maximize the firm value. For example, the marginal effect of IDT shows that one unit increase in deviation from the industry average debt ratio increases the probability of equity issue by 106.6%, in order to adjust leverage back to target level. The coefficients on marginal effects can be greater than one, even if the probability of binary choice is between 0% and 100%, as the slope of the

function can be greater than one. However, the results do not provide support for the trade-off theory using historical average debt ratio as an alternative proxy for target capital structure.

Nevertheless, I did not find evidence that firms issue equity when they are overvalued and have low level of information asymmetry over the sample period of 2005 to 2011. As Barclay and Smith (2005) state, equity issues are the most expensive type of external financial instrument in terms of both transaction costs and information costs. Equity issuance convey negative information to the market that managers attempt to raise cheap capital, and therefore, it may experience immediate negative post issue stock returns. Mahajan and Tartaroglu (2008) find that prevailing market to book ratio does not help to explain the equity issuance decisions, and they report that the dramatic slowdown in Japanese economy in twentieth century and decline in equity market may help to explain the reason why they fail to time the equity market.

However, I find that firms are likely to conduct dual issues when their equity are overvalued. Dual issues share the characteristics of both equity and debt, and are less leverage-increasing than debt issues, which provide partial support that firms attempt to issue overvalued equity. Contrary to the negative relationship between information asymmetry and equity issuance that equity issuers have temporarily low level of information asymmetry before the issues (Autore and Kovacs, 2010), when firm size is used as an inverse proxy for information asymmetry, the negative coefficient on firm size show that small firms are likely to conduct dual issues rather than large firms. Small firms tend to have higher information asymmetry than large firms (Rajan and Zingales,1995; Ozkan, 2001; Chang et al, 2006), and therefore, they have higher information costs when they issue equity. The negative relationship between firm size and

probability to issue debt versus dual issues provide partial support for the pecking order theory that firms issue equity under financial distress, as the equity issues are the most expensive and the information costs associated with equity issues are the highest. Furthermore, the positive coefficient on research and development expense confirms that high level of growth opportunities is associated with higher probability of dual issues. This indicates that firms are likely to issue both debt and equity to finance their growth opportunities.

Interestingly, I find that dual issuers are likely to be over-levered and debt issuers are likely to be under-levered. The result suggests that dual issuers offset the deviation from target capital structure as measured by industry average debt ratio, which provide additional support for the trade-off theory of capital structure. The coefficient of marginal effect show that one unit increase in the deviation from target capital structure makes firms 44.5% more likely to conduct dual issues. Last but not least, I find that dual issuers have high prior issue stock return and equity issuers have low prior issue stock return in model 3.

Table 2.7 presents the logistic estimation of the effects of market timing on security issuance decisions using net changes in equity or debt issues as dependent variable over the period of 2005 to 2011. The independent variable CEO equals to 1 if CEO is not chairman on board, 0 otherwise. The variable CEO is excluded across all the models, because the variation of CEO is extremely low. There is only 1 observation that CEO is also chairman on board within 154 observations in model 1, none in model 2 and 1 in model 3, as on most of the board CEO is not chairman in modern firms. Besides, all the dual issuers in the sample does not have credit rating, which would result in perfect prediction problem, and hence ACS is excluded in model 2 and model 3. Furthermore, as discussed earlier, there is a significant positive correlation

between board size and firm size, and therefore, BOD is excluded across all the models to avoid the problem of multicollinearity.

Table 2.7
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Characteristics

Independent Variables	Debt Issues vs. Equity Issues	AMEs	Debt Issues vs. Dual Issues	AMEs	Dual Issues vs. Equity Issues	AMEs
	(1)		(2)		(3)	
Dependent Variable: *EQUITY*						
RI	-6.066**	-0.524**	-2.185	-0.113	-5.970**	-0.508**
	(0.022)	(0.017)	(0.664)	(0.660)	(0.018)	(0.022)
IMB	0.112	0.010	1.997***	0.104***	-0.308	-0.026
	(0.768)	(0.767)	(0.007)	(0.005)	(0.639)	(0.631)
SIZE	-0.360	-0.031	-2.356***	-0.122**	1.183	0.101
	(0.562)	(0.564)	(0.005)	(0.035)	(0.166)	(0.156)
IND	-2.869	-0.248	14.036**	0.729*	1.416	0.120
	(0.442)	(0.430)	(0.013)	(0.062)	(0.752)	(0.755)
AUD	0.559	0.048	-4.593	-0.238	-6.307	-0.537
	(0.889)	(0.889)	(0.454)	(0.509)	(0.214)	(0.191)
AIN	0.371	0.032	-4.627***	-0.240***	0.793	0.068
	(0.715)	(0.714)	(0.002)	(0.008)	(0.606)	(0.607)
CAP	-3.563	-0.308	-3.470	-0.180	6.708	0.571
	(0.774)	(0.773)	(0.942)	(0.942)	(0.757)	(0.757)
RD	42.778	3.692*	111.10*	5.769**	-6.743	-0.574
	(0.109)	(0.085)	(0.060)	(0.031)	(0.634)	(0.621)
ACS	1.176	0.102				
	(0.228)	(0.228)				
ROA	-19.137**	-1.652**	-11.536	-0.599	6.491	0.552
	(0.016)	(0.014)	(0.404)	(0.443)	(0.590)	(0.585)
TANG	-7.705***	-0.665***	-5.589	-0.290	-0.206	-0.018
	(0.003)	(0.002)	(0.273)	(0.228)	(0.932)	(0.932)
HDT	6.282	0.542	-17.694	-0.919	11.331	0.964*
	(0.173)	(0.171)	(0.167)	(0.179)	(0.144)	(0.093)
IDT	11.268***	0.973***	15.358**	0.797*	1.817	0.155
	(0.001)	(0.000)	(0.029)	(0.078)	(0.600)	(0.594)
QCK	0.525	0.045	-2.376	-0.123	-0.290	-0.025
	(0.654)	(0.657)	(0.250)	(0.239)	(0.890)	(0.891)
Constant	-2.763		5.706		-4.424	
	(0.487)		(0.447)		(0.542)	
Pseudo R^2	0.558		0.511		0.523	
DV = 0	106		106		13	
DV = 1	48		13		48	
Obs.	154		119		61	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

Instead of using corporate governance index as a proxy for information asymmetry, I use

individual corporate governance characteristics as proxies for information asymmetry in table 2.7. In line with the results in table 2.6, I find that firms with lower stock return, profitability and tangible assets, and over-levered firms are more likely to issue equity in model 1, firms that are smaller, have higher industry-adjusted market to book ratio and growth opportunities, and over-levered firms are more likely to issue both debt and equity in model 2, and firms with lower stock return are more likely to conduct dual issues in model 3. The R squares show that the explanatory variable can explain 55.8%, 51.1% and 52.3% of the variability of dependent variable in model 1, 2 and 3 respectively.

Differently, while in the previous results I did not find significant association between corporate governance quality and security issuance, I use individual corporate governance characteristics as inverse proxy of information asymmetry and find that firms with higher proportion of independent non-executive directors on board are more likely to conduct dual issues, which indicate that dual issuers tend to have lower information asymmetry than debt issuers. However, the negative coefficient on audit committee independence is quite contradictory, which suggests that dual issuers tend to have higher information asymmetry than debt issuers. As the negative coefficient on firm size suggests that firms with higher information asymmetry are likely to conduct dual issues, I would be inclined to support the explanation of audit committee independence on debt issues versus dual issues.

Table 2.8 presents the effects of market timing variables on the choice between debt and equity using net changes in equity or debt issues as dependent variable before and during the financial crisis. Due to the limitation of the sample size, dual issuers are not included from the analysis.

Table 2.8
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Index for the Periods of 2005-2007 and 2008-2011

Independent Variables	Debt Issues vs. Equity Issues 2005-2007 (1)	AMEs	Debt Issues vs. Equity Issues 2008-2011 (2)	AMEs
Dependent Variable: *EQUITY*				
RI	-4.819	-0.488	-4.048***	-0.500***
	(0.160)	(0.151)	(0.007)	(0.001)
IMB	0.144	0.015	-0.098	-0.012
	(0.709)	(0.709)	(0.809)	(0.808)
SIZE	0.221	0.022	0.475	0.059
	(0.743)	(0.739)	(0.370)	(0.371)
GOV	-0.380	-0.038	0.122	0.015
	(0.380)	(0.384)	(0.670)	(0.665)
CAP	33.835*	3.425*	-4.314	-0.533
	(0.074)	(0.057)	(0.687)	(0.683)
RD	43.368	4.390	6.880	0.850
	(0.264)	(0.201)	(0.723)	(0.722)
ACS	1.687	0.171	-0.170	-0.021
	(0.174)	(0.150)	(0.851)	(0.852)
ROA	-1.950	-0.197	-10.780*	-1.332*
	(0.845)	(0.844)	(0.078)	(0.074)
TANG	-11.776***	-1.192***	-0.401	-0.050
	(0.005)	(0.006)	(0.798)	(0.799)
HDT	2.244	0.227	14.778***	1.826***
	(0.709)	(0.709)	(0.003)	(0.001)
IDT	1.823	0.185	6.553**	0.810**
	(0.635)	(0.614)	(0.023)	(0.015)
QCK	1.457	0.148	-0.019	-0.002
	(0.411)	(0.437)	(0.984)	(0.984)
Constant	-1.568		-3.914	
	(0.653)		(0.288)	
Pseudo R^2	0.319		0.415	
DV = 0	45		61	
DV = 1	10		38	
Obs.	55		99	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

I find that firms with lower stock return have higher probability to issue equity during the financial crisis, which is significant at 1% level. However, such relationship does not exist for the period before the financial crisis, which confirms that the negative relationship between stock return and debt versus equity issues over the period of 2005 to 2011 is mainly driven by the effect of stock return during the financial crisis. The coefficient of marginal effect on RI suggests that one unit decrease in stock return increase the probability of equity issues by

50%, which is significant at 1%.

In addition, the results give support that firms with lower profitability are more likely to issue equity during the financial crisis, and however, this negative relationship does not significant for the period before the financial crisis, which provides evidence that this relationship over the whole sample period is driven by the effect of profitability during the financial crisis. The coefficient estimates on stock return and profitability reveal that firms are more likely to issue equity under financial distress during the financial crisis. Dissanaike et al (2014) argue that even though equity issues are conventionally seen as a negative signal that firms tend to exploit the overvaluation of equity, however, equity issues may be seen as a positive signal during the financial crisis, as market would be relieved to see that equity issues might save the firm from insolvency. Leary (2009) argues that during a period of limited credit and constrained access to the bank loans, small firms tend to reply more on equity financing and large firms tend to issue long-term debts as substitute for the bank loans, which provides additional supports that firms issue equity under financial duress during the financial crisis, as equity issuers tend to be small firms, which are likely to have high levels of information costs as a result from the information asymmetry between managers and shareholders.

As Van Duyn and Bullock (2009, p.1) write, "Access to capital, whether debt or equity, has mitigated fears of apocalyptic default that threatened to extend the economic downturn." They report that the amounts of global equity and debt issues during the financial crisis are almost twice as much as the equity and debt issues before the financial crisis. As can be seen in the number of equity and debt issuance in Table 2.10, between 2005 and 2007, there are 10 equity issues and 45 debt issues, and between 2008 and 2011, there are 38 equity issues and 61 debt

issues. Specifically, the average equity issues per year between 2008 and 2011 is significantly higher than average equity issues between 2005 and 2007, and the average debt issues do not differ significantly.

Moreover, as an alternative proxy for investment opportunities, capital expenditure is used as a proxy for investment in tangible assets, such as mergers and acquisitions and purchases of new plant and equipment. The positive coefficient on capital expenditure implies that firms with higher level of capital expenditure are more likely to issue equity for the period of 2005 to 2007, which is consistent with Dittmar and Thakor (2007) that firms issue equity to finance their capital expenditure. The significant marginal effect reports that one unit increase in capital expenditure to total assets ratio increases the probability of equity issues by 342.5%, which shows relatively strong economic significance.

Furthermore, I find that firms with higher asset tangibility have higher probability to issue debt, this is not surprising that firms with higher levels of tangible assets that can be used as collaterals to secure debt have greater potential and likelihood to issue debt, as debt is a preferred source of external capital as suggested by the pecking order theory. Interestingly, using both historical and industry average debt ratios as proxies for target capital structure, I find that over-levered firms are more likely to issue equity and under-levered firms are more likely to issue debt, which are statistically and economically significant. However, this significant relationship only exists for the period during the financial crisis, but not before the financial crisis, although the coefficients for deviation from target capital structure from 2005 to 2007 are positive as expected. The results imply that due to greater costs of deviation from target capital structure, firms pay more attention on their capital structure and tend to actively

adjust their capital structure toward the targets.

Table 2.9
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 1 with Governance Characteristics for the Periods of 2005-2007 and 2008-2011

Independent Variables	Debt Issues vs. Equity Issues 2005-2007 (1)	AMEs	Debt Issues vs. Equity Issues 2008-2011 (2)	AMEs
Dependent Variable: *EQUITY*				
RI	-4.673	-0.465	-4.054***	-0.496***
	(0.299)	(0.283)	(0.006)	(0.002)
IMB	-0.005	-0.001	-0.117	-0.014
	(0.990)	(0.990)	(0.788)	(0.788)
SIZE	0.254	0.025	0.511	0.062
	(0.829)	(0.828)	(0.355)	(0.365)
IND	-0.865	-0.086	-0.398	-0.049
	(0.914)	(0.914)	(0.891)	(0.891)
AUD	-2.807	-0.279	2.850	0.348
	(0.662)	(0.665)	(0.461)	(0.461)
AIN	1.056	0.105	0.468	0.057
	(0.339)	(0.365)	(0.771)	(0.769)
CAP	32.391*	3.224*	-4.430	-0.541
	(0.080)	(0.062)	(0.662)	(0.657)
RD	59.985	5.970	8.923	1.091
	(0.165)	(0.129)	(0.654)	(0.653)
ACS	2.043	0.203	-0.246	-0.030
	(0.179)	(0.170)	(0.798)	(0.800)
ROA	0.785	0.078	-10.913*	-1.334*
	(0.952)	(0.953)	(0.089)	(0.081)
TANG	-10.500**	-1.045**	-0.287	-0.035
	(0.014)	(0.015)	(0.843)	(0.843)
HDT	1.531	0.152	15.091***	1.845***
	(0.816)	(0.816)	(0.003)	(0.001)
IDT	2.171	0.216	6.844**	0.837**
	(0.533)	(0.503)	(0.040)	(0.031)
QCK	1.246	0.124	-0.027	-0.003
	(0.368)	(0.394)	(0.980)	(0.980)
Constant	-2.752		-5.129	
	(0.597)		(0.177)	
Pseudo R^2	0.326		0.420	
DV = 0	45		61	
DV = 1	10		38	
Obs.	55		99	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

Table 2.9 provides alternative logistic estimations using individual corporate governance characteristics as inverse proxy for information asymmetry. The variable CEO is excluded as

the low variation of observations. While the results are the same as the previous table, I did not find evidences that individual governance characteristics affect the probability of debt versus equity issues before and during the financial crisis.

2.5.4 Logistic Analysis on Deals Information

Table 2.10 presents the multivariate results using exact seasoned equity issues as proxy for equity issues over the period of 2005 to 2011, this would distinguish between seasoned equity issues and initial public offerings, and between equity issues and convertible debt issues. The R squares show that the explanatory variables explain 42%, 32.8% and 41.4% of the variability of dependent variable in model 1, 2 and 3 respectively, which is slightly lower than the R squares presented in table 2.6.

Different from the previous results, I find that firms with better corporate governance quality are more likely to issue debt as opposed to dual issues over the period of 2005 to 2011, which suggests that firms with lower information asymmetry tend to issue debt and firms with higher information asymmetry tend to issue both debt and equity. The marginal effect shows that one unit increase in corporate governance index increases the probability of debt issues by 6.8%, which is statistically significant at 5%. This result provides support to the view that equity issuers tend to have high levels of information asymmetry and information costs, and equity issues are often used as a last resort of corporate financing.

Table 2.10
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Index

Independent Variables	Debt Issues vs. Equity Issues	AMEs	Debt Issues vs. Dual Issues	AMEs	Dual Issues vs. Equity Issues	AMEs
	(1)		(2)		(3)	
Dependent Variable: *EQUITY*						
RI	0.069	0.009	0.978	0.069	-3.809	-0.309
	(0.968)	(0.968)	(0.688)	(0.685)	(0.358)	(0.344)
IMB	-0.175	-0.022	-0.542	-0.038	0.565	0.046
	(0.525)	(0.524)	(0.249)	(0.246)	(0.281)	(0.284)
SIZE	0.239	0.030	0.202	0.014	-0.470	-0.038
	(0.544)	(0.542)	(0.703)	(0.703)	(0.578)	(0.572)
GOV	-0.335	-0.041	-0.975**	-0.068**	0.511	0.041
	(0.168)	(0.165)	(0.024)	(0.017)	(0.348)	(0.331)
CAP	-3.403	-0.422	25.882	1.815	-64.275	-5.222*
	(0.799)	(0.799)	(0.143)	(0.132)	(0.127)	(0.082)
RD	32.162**	3.987**	37.149**	2.605**	-54.360*	-4.416*
	(0.016)	(0.011)	(0.026)	(0.015)	(0.090)	(0.060)
ACS	-0.007	-0.001	-0.904	-0.063	4.380	0.356
	(0.994)	(0.994)	(0.482)	(0.488)	(0.187)	(0.153)
ROA	-9.535*	-1.182*	2.279	0.160	-14.405	-1.170
	(0.099)	(0.087)	(0.874)	(0.872)	(0.471)	(0.468)
TANG	-3.154	-0.391	-7.610	-0.534	13.099	1.064
	(0.224)	(0.224)	(0.112)	(0.110)	(0.199)	(0.169)
HDT	5.249	0.651	-6.616	-0.464	40.916	3.324*
	(0.205)	(0.201)	(0.219)	(0.239)	(0.110)	(0.079)
IDT	3.511	0.435	5.624	0.394	-14.579	-1.184
	(0.110)	(0.108)	(0.148)	(0.152)	(0.262)	(0.242)
QCK	0.901	0.112	1.379	0.097	2.441	0.198
	(0.278)	(0.278)	(0.341)	(0.337)	(0.477)	(0.469)
Constant	-4.413*		-5.278		4.443	
	(0.094)		(0.174)		(0.553)	
Pseudo R^2	0.420		0.328		0.414	
DV = 0	106		106		13	
DV = 1	70		13		70	
Obs.	176		119		83	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

Moreover, firms with higher research and development expense have higher probability to conduct dual issues as opposed to equity issues in model 3, which has a relatively low level of significance and is significant at 10% level. Barclay and Smith (1999) argue that firms with higher growth opportunities tend to issue debt rather than equity, as debt issues are cheaper and have fewer restrictive covenants. As dual issues are more leverage-increasing than equity issues, one could argue that equity issuers may be likely to have lower growth opportunities.

Likewise, although the negative coefficient on CAP in the logistic regression is insignificant, the negative coefficient on CAP in the marginal effect is significant at 10%, which suggests that firms with higher capital expenditure have higher probability of dual issues.

The findings on growth opportunities and capital expenditure are inconsistent with previous findings that firms with higher growth opportunities and capital expenditure are more likely to issue equity, which is worth discussing. As Hovakimian et al (2004) point out, the amount of capital raised through dual issues tend to be fairly large, and the average dual issue size is 61.5% of total assets, which is approximately double of an average equity issue size and triple of an average debt issue size, and therefore, dual issues are important events that may induce substantial changes in firms' capital structure. The previous results provide evidences that firms with high levels of growth opportunities and capital expenditure are more likely to issue equity or issue both debt and equity, and table 2.10 shows that firms with higher investment opportunities are more likely to issue both debt and equity as opposed to equity, which implies that issue size is a very important consideration when firms need to finance their investment opportunities, including investments in tangible assets and intangible assets.

Table 2.11 below shows the logistic regression results using exact seasoned equity issues as proxy for equity issues over the period of 2005 to 2011, instead of using corporate governance index as a proxy for information asymmetry, I include the individual corporate governance characteristics in the logistic analysis. The variable CEO is excluded from the analysis due to low variation in the observations.

Table 2.11
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Characteristics

Independent Variables	Debt Issues vs. Equity Issues	AMEs	Debt Issues vs. Dual Issues	AMEs	Dual Issues vs. Equity Issues	AMEs
	(1)		(2)		(3)	
Dependent Variable: *EQUITY*						
RI	-0.270	-0.034	-0.604	-0.041	-5.706	-0.434
	(0.876)	(0.875)	(0.814)	(0.814)	(0.428)	(0.390)
IMB	-0.158	-0.020	-0.637	-0.043	0.455	0.035
	(0.578)	(0.577)	(0.111)	(0.115)	(0.474)	(0.459)
SIZE	0.123	0.015	0.196	0.013	0.533	0.041
	(0.803)	(0.802)	(0.780)	(0.778)	(0.627)	(0.620)
IND	1.280	0.160	-1.752	-0.119	-1.813	-0.138
	(0.654)	(0.654)	(0.762)	(0.761)	(0.756)	(0.748)
AUD	-1.672	-0.209	-8.166	-0.555	10.329	0.786*
	(0.526)	(0.525)	(0.110)	(0.127)	(0.127)	(0.057)
AIN	-0.153	-0.019	1.032	0.070	-0.898	-0.068
	(0.865)	(0.865)	(0.387)	(0.398)	(0.770)	(0.774)
CAP	-3.011	-0.377	20.883	1.418	-88.630**	-6.748***
	(0.829)	(0.829)	(0.265)	(0.260)	(0.033)	(0.009)
RD	27.742**	3.471**	43.885***	2.980***	-58.096*	-4.424**
	(0.045)	(0.036)	(0.008)	(0.005)	(0.055)	(0.047)
ACS	0.302	0.038	0.009	0.001	4.973	0.379
	(0.710)	(0.710)	(0.996)	(0.996)	(0.172)	(0.136)
ROA	-9.047	-1.132*	3.595	0.244	-14.335	-1.091
	(0.110)	(0.098)	(0.797)	(0.795)	(0.485)	(0.506)
TANG	-3.706	-0.464	-6.978*	-0.474*	19.580	1.491
	(0.160)	(0.158)	(0.071)	(0.079)	(0.141)	(0.136)
HDT	5.646	0.707	-4.186	-0.284	49.699*	3.784*
	(0.151)	(0.146)	(0.511)	(0.512)	(0.078)	(0.066)
IDT	3.738*	0.468*	7.040*	0.478*	-18.262	-1.390
	(0.088)	(0.086)	(0.063)	(0.079)	(0.209)	(0.221)
QCK	0.775	0.097	1.210	0.082	3.623	0.276
	(0.333)	(0.331)	(0.417)	(0.435)	(0.364)	(0.378)
Constant	-3.929		-5.053		-2.932	
	(0.207)		(0.222)		(0.684)	
Pseudo R^2	0.414		0.350		0.448	
DV = 0	106		106		13	
DV = 1	70		13		70	
Obs.	176		119		83	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

In consistent with the results in table 2.10, I find that firms with higher growth opportunities and capital expenditure are more likely to issue both debt and equity in model 3, and firms with higher growth opportunities are more likely to issue equity in model 1 and issue both debt and equity in model 2, which suggest a hierarchy of preference that firms prefer to

finance their investment opportunities first with dual issues, second with equity issues and third with debt issues. Among all the types of security issues, one could argue that issue size is one of the most important determinants when firms need to finance their investments.

Moreover, I find that over-levered firms are more likely to issue equity and under-levered firms are more likely to issue debt in model 1. Beside, over-levered firms are more likely to issue both debt and equity and under-levered firms are more likely to issue debt in model 2. Furthermore, over-levered firms have higher probability to issue equity and under-valued firms have higher probability to issue both debt and equity in model 3. Therefore, it can be seen that dual issues play an important role in the adjustment to the target capital structure, and firms may deliberately choose the amount of debt and equity issued in their corporate financing decisions.

Table 2.12 presents the logistic regression results using corporate governance index for the sample periods before and during the financial crisis. Due to the limitation of sample size, dual issues are not included in the analysis. The negative coefficients on RI and ROA suggest that firms with lower stock return and profitability are more likely to issue equity during the financial crisis, which give supports to the view that firms issue equity under financial distress. The positive coefficient on IMB is almost significant at 10% level, while the coefficient on marginal effect is statistically significant at 10% level, which shows some support that firms tend to issue overvalued equity from 2005 to 2007. However, the coefficient on IMB become negative and nearly significant at 10% level for the period of 2008 to 2011, which suggests that firms have propensity to issue undervalued equity during the financial crisis, which gives support to the view that distressed firms are likely to issue equity. The marginal effects on

IMB are significant and different for the periods before and during the financial crisis, and specifically, one unit increase in the industry-adjusted market to book ratio increases the probability of equity issues by 5.2% before the financial crisis and decreases the probability of equity issues by 8.7% during the financial crisis.

Table 2.12
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Index for the Periods of 2005-2007 and 2008-2011

Independent Variables	Debt Issues vs. Equity Issues 2005-2007 (1)	AMEs	Debt Issues vs. Equity Issues 2008-2011 (2)	AMEs
Dependent Variable: *EQUITY*				
RI	0.413	0.036	-1.694*	-0.329*
	(0.896)	(0.895)	(0.086)	(0.070)
IMB	0.594	0.052*	-0.446	-0.087*
	(0.106)	(0.056)	(0.108)	(0.100)
SIZE	1.359	0.118	-0.013	-0.003
	(0.127)	(0.153)	(0.973)	(0.973)
GOV	-1.292***	-0.113***	0.089	0.017
	(0.001)	(0.008)	(0.721)	(0.720)
CAP	17.824	1.553	1.409	0.273
	(0.495)	(0.462)	(0.886)	(0.886)
RD	16.892	1.472	-4.405	-0.855
	(0.281)	(0.249)	(0.730)	(0.731)
ACS	-0.635	-0.055	0.356	0.069
	(0.697)	(0.702)	(0.634)	(0.632)
ROA	-0.536	-0.047	-9.628**	-1.869**
	(0.970)	(0.970)	(0.034)	(0.022)
TANG	-9.625**	-0.839**	-3.005**	-0.583**
	(0.038)	(0.018)	(0.031)	(0.026)
HDT	2.601	0.227	6.293	1.222
	(0.568)	(0.546)	(0.118)	(0.113)
IDT	-1.165	-0.101	3.503	0.680*
	(0.817)	(0.817)	(0.109)	(0.094)
QCK	2.975**	0.259*	0.159	0.031
	(0.050)	(0.091)	(0.805)	(0.805)
Constant	-7.050**		0.672	
	(0.024)		(0.801)	
Pseudo R^2	0.382		0.178	
DV = 0	48		58	
DV = 1	10		60	
Obs.	58		118	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

As corporate governance index act as inverse proxy for information asymmetry, I find that

firms with lower levels of information asymmetry are more likely to issue debt for the period of 2005 to 2007. Nevertheless, the negative effect of corporate governance index on debt versus equity issues does not support the finding of Mande et al (2012) that due to lower agency costs associated with better corporate governance quality, the likelihood of equity issue against debt issue increases with the increases in the overall corporate governance quality. With regards to the firm characteristics, I find that firms with higher amount of tangible assets are more likely to issue debt as opposed to equity issues for both of the sample periods. The marginal effects on asset tangibility change from the sample period of 2005 to 2007 to period of 2008 to 2011, as the economic significance reduces over the periods. One unit increase in asset tangibility increases the probability of debt issues by 83.9% before the financial crisis, and however, one unit increase in asset tangibility increases the likelihood of debt issues by 58.3% during the financial crisis, which may attribute to the supply side of debt that has been contracted significantly during the financial crisis. Furthermore, the positive coefficient on quick ratio implies that firms with more liquid assets are more likely to issue equity. This is in line with the hypothesis that firms with greater liquidity tend to have lower debt ratios. As states by Ozkan (2001), the negative relationship between liquidity and debt ratio may be due to conflict of interests between shareholders and debtholders in the firms, as the amount of liquidity shows the extent to which the liquid assets can be manipulated by shareholders at the costs of debtholders.

Table 2.13 presents the logistic estimations using individual corporate governance characteristics for the sample periods before and during the financial crisis. CEO is excluded due to low variation in the observations. As an inverse proxy of information asymmetry, I find that the proportion of audit committee members on board is negatively related to the

probability of debt versus equity issues, which provide additional supports that equity issuers are likely to have high levels of information asymmetry. Other corporate governance characteristics do not affect the corporate financing choice of firms.

Table 2.13
Logistic Analysis of Predicted Effect on Issuance Decision for Dataset 2 with Governance Characteristics for the Periods of 2005-2007 and 2008-2011

Independent Variables	Debt Issues vs. Equity Issues 2005-2007 (1)	AMEs	Debt Issues vs. Equity Issues 2008-2011 (2)	AMEs
Dependent Variable: *EQUITY*				
RI	1.587	0.152	-1.650*	-0.320*
	(0.634)	(0.618)	(0.093)	(0.078)
IMB	0.461	0.044	-0.451	-0.087
	(0.292)	(0.220)	(0.110)	(0.102)
SIZE	1.322	0.126	-0.022	-0.004
	(0.151)	(0.209)	(0.959)	(0.959)
IND	0.989	0.094	-0.325	-0.063
	(0.850)	(0.848)	(0.890)	(0.890)
AUD	-8.358**	-0.798*	0.698	0.135
	(0.036)	(0.055)	(0.798)	(0.798)
AIN	0.054	0.005	0.363	0.070
	(0.962)	(0.962)	(0.693)	(0.693)
CAP	16.495	1.575	1.620	0.314
	(0.484)	(0.451)	(0.870)	(0.870)
RD	26.065	2.489	-3.853	-0.748
	(0.285)	(0.265)	(0.771)	(0.772)
ACS	0.312	0.030	0.343	0.067
	(0.822)	(0.820)	(0.629)	(0.627)
ROA	-5.654	-0.540	-9.597**	-1.862**
	(0.587)	(0.588)	(0.038)	(0.025)
TANG	-8.903*	-0.850**	-2.987**	-0.580**
	(0.053)	(0.029)	(0.031)	(0.027)
HDT	4.286	0.409	6.442	1.250
	(0.366)	(0.326)	(0.110)	(0.105)
IDT	0.591	0.056	3.475	0.674*
	(0.881)	(0.882)	(0.111)	(0.095)
QCK	2.177*	0.208	0.135	0.026
	(0.096)	(0.161)	(0.837)	(0.837)
Constant	-7.299*		0.591	
	(0.099)		(0.842)	
Pseudo R^2	0.335		0.179	
DV = 0	48		58	
DV = 1	10		60	
Obs.	58		118	

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regression technique used is the logistic regression with robust standard errors controlling for heteroscedasticity. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

2.6 Conclusions and Recommendations

The main purpose of this study is to investigate the relationship between security issuance and marketing timing based on a sample of UK public limited firms over the period of 2005 to 2011. This study contributes to the market timing literatures and generates new insights into the corporate financing decisions in the UK. Specifically, contrary to the previous studies that firms issue equity when stock return is high and equity is overvalued, I find evidences that firms are more likely to issue equity after periods of negative stock returns and undervaluation of equity, which give supports that firms issue equity under financial distress, even though I find limited evidences that firms attempt to issue overvalued equity before the financial crisis. Besides, by using firm size and corporate governance as inverse proxies for information asymmetry, the results suggest that the probability of equity issuance increases when firm size and corporate governance quality decrease indicating higher level of information asymmetry, which is significantly different from previous studies in the US that firms tend to issue equity after recent declines in information asymmetry in an attempt to reduce the information costs. The results are in line with the pecking order theory that equity issuers have high level of information asymmetry and are likely to be under financial duress, and equity issuance is only considered as a last resort when no other financing options are available. As Mande et al (2012) point out, agency costs occur for both equity and debt issues, and however, the effect of agency costs is more significant for equity issues rather than debt issues, which implies that the influence of agency costs is more severe for equity issuers. Furthermore, I find that profitability is negatively related to the probability of debt versus equity issues during the financial crisis, which add additional supports for pecking order theory that profitable firms prefer to finance their investments with debt rather than equity, which can attribute to the information costs associated with equity issues as a result of information asymmetry between

managers and external shareholders.

However, in contrast to the pecking order theory that equity is issued by firms under financial distress, I find that the probability of debt versus equity issues and probability of debt versus dual issues are positively associated with investment opportunities as proxied by capital expenditure and research and development expense, whereas the probability of dual versus equity issues is negatively related to investment opportunities. The results reveal that firms do not issue equity as a last resort of financing, instead, they use the proceeds of equity issues to finance their investment opportunities. More importantly, the results suggest that issue size of external financing instruments is an important consideration for the firms when they need to finance their projects, as dual issues often have the largest size of issue, followed by equity issues and debt issues, I find that firms have tendency in choosing the external financing with the largest issue size and have preferences in dual issues, second with equity issues and third with debt issues. To my knowledge, this has not been documented in any prior UK studies in market timing context. One potential avenue for future research is an in-depth examination of the effect of issue size on corporate financing decisions in the UK.

The results do not support that bond market access, as proxied by credit rating, has significant influence on the security issuance decisions in the UK over the sample period of 2005 to 2011. This may attribute to the fact that UK firms prefer to finance themselves with short-term bank loans and equity rather than long-term debt due to the stricter bankruptcy code in the UK compared to the US market. As Acharya et al (2011) report, firms operate in countries with strong creditor protection are likely to have lower financial leverage, because strong credit protection may limit the firms' access to external debt. Therefore, increases in debt financing

especially the long-term debt would increase the risk of being liquidated by the creditors for not paying back the debt interests promptly, and hence, the UK firms tend to issue short-term bank loans rather than long-term debts as short-term loans are more flexible in terms of debt negotiations. As a result, although credit rating offers an alternative source of capital to the UK firms, firms with credit ratings do not issue a significant amount of long-term debt that leads to an insignificant relationship between security issuance and corporate credit rating.

With regards to firm characteristics, in addition to the negative relation between profitability and probability of debt versus equity issues, I find that debt issuers are likely to have high level of tangible assets that can be used as collateralization to secure the debt borrowings. Moreover, I examine the effect of target capital structure on corporate financing choices and the target capital structure is measured by the historical and industry average debt ratios, I find that over-levered firms tend to issue equity and under-levered firms have propensity to issue debt, which is consistent with classical trade-off theory but inconsistent with pecking order theory. The trade-off theory suggests that firms have target capital structure and tend to trade-off between the costs and benefits of debt in order to reduce the costs of capital and maximize the firm value, as deviation from target capital structure can be costly, firms adjust their capital structure back to the target level through issuing debt and equity. However, the pecking order theory does not support the target capital structure that firms can drift away from their target levels of capital structure. As Fama and French (2005) state, the trade-off theory and pecking order theory have been tested in isolation from one another, each of them has elements to explain some aspects of firms' corporate financing decisions, and however, it is best to regard the two models as complements or stable mates.

Having divided the sample periods into two sub periods, which are before and during the financial crisis respectively, I find that the negative effects of stock return, market valuation and profitability on the probability of debt versus equity issues are prominently driven by the period during the financial crisis. In addition, I find that the amount of equity issued significantly increased during the financial crisis, which offers supports that firms issue equity during the period of financial distress.

Chapter 3

Effects of Credit Rating and Corporate Governance on Capital Structure

3.1 Introduction

[4]Credit rating is prevalent in financial markets. The credit rating agencies assess the creditworthiness and the default risk of market debt issuers, and the credit ratings are used to facilitate the decision making process of the external investors. Nowadays, credit rating is an important concern for the firms that wish to issue long-term public debts, such as commercial papers, gilts and corporate bonds, managers often want to have better ratings because of the greater needs for access to the debt capital market for investments and also to satisfy the considerations of the customers and external shareholders about the firms' long-term sustainability in their business life cycle (Hovakimian et al, 2009). Besides, Kisgen (2012) states that investment grade rating would allow firms to gain cheaper and easier access to the external funding from financial institutions and external investors, and also, it would help the firms to invest in new investment opportunities with lower cost of capital.

Empirical literatures suggest that credit rating is one of the most important considerations for the managers while making their capital structure decisions. According to a survey based on 392 CFOs, Graham and Harvey (2001) find that both the financial flexibility and credit rating

[4] I was invited and presented "Effect of Credit Rating on Capital Structure" in the Global Finance Conference in Monterey, USA in 2013, I also presented this study in the Doctoral Research Seminar in Birmingham Business School in Birmingham, UK.

affect managerial decision to issue debt, and managers tend to consider earnings per share dilution and recent share price appreciation while issuing equity. As a primary determinant of the cost of borrowing, they find that credit rating is the second most important determinants after financial flexibility for the managers when issuing debt, which is even more important than any other traditional capital structure determinants, such as debt tax shield.

Similar to the original trade-off theory of capital structure that firms tend to trade-off between benefits and costs of debt, firms have propensity to trade-off between the benefits of credit rating upgrade and costs of credit rating downgrade by adjusting their capital structure. The benefits of credit rating upgrade may include reduction in interest rate, cheaper bond market access, access to the commercial paper market, and cheaper and more sustainable financing opportunities. However, on the other hand, the costs of credit rating downgrade may include the increase in interest rate that firms have to afford for their external debt financing, inability to access to the bond market and commercial paper market, and losing valuable investment opportunities because of lack of funding.

Credit rating agencies, such as Standard & Poor's, Moody's and Fitch,[5] incorporate the credit rating procedure by analysing the business and financial risks of firms in order to provide unbiased and independent opinions regarding to the credit risk and creditworthiness of firms to the outside investors (Stowell, 2010). Business risks include the risks of firm's profitability, market share, product diversification and management quality, and financial risks include the firms' accounting quality, capital structure, financial flexibility and corporate governance. As one of the most important measurements of financial risk, capital structure plays an vital role

[5] Standard & Poor's, Moody's and Fitch are known as "big three", which represents the three largest credit rating agencies in the world.

in determining the firms' credit rating level and default risk on their corporate borrowings.

Nowadays, there are three main criticisms regarding to the credit rating agencies. The first is the lack of timeliness and accuracy (Cheng and Neamtiu, 2009). For example, credit rating agencies kept some firms with investment grade ratings just for the days before some high profile bankruptcies, such as Enron. Also, Jarrow and Xu (2010) report that credit rating agencies provided positive ratings for the mortgage backed securities, collateralized debt obligations, and structured finance products before the sub-prime mortgage crisis in 2008, whereas these financial products are considered as extremely risky. Hull (2009) reports that market participants rely too much on the AAA ratings assigned to the financial products without properly evaluating the rating models used by the credit rating agencies. Moreover, Faux and Shenn (2011) address the downgrade of the US sovereign bond rating from AAA to AA+ in September 2011 by S&P's, which is one notch below AAA, and however, they report that about 14,000 structured finance products in the US are rated as AAA, and they said, "the rating discrepancy implied that some securitized debts could survive a default by the US Government. That's hard to believe." Bolton et al (2012) investigate the conflicts of interest in the credit rating industry and report that credit rating agencies often understate the risks to attract more and more businesses. Guttler (2011) finds that S&P's reports the credit ratings in a timelier manner than Moody's.

In addition, the second criticism implies that the credit rating services is virtually paid by the rated entities rather than the investors, which may affect the "unbiased" and "independent" opinion of credit rating. As Jarrow and Xu (2010) and Becker and Milbourn (2011) point out, the credit rating services, which are paid by the debt issuers, may be problematic and credit

rating agencies may be vulnerable to the influences of their paying clients. Moreover, Guttler (2011) states that credit rating agencies are considered with increasing scepticism due to the fee paying structure that the debt issuers pay a significant amount of credit rating fees, which is the main source of revenue of credit rating agencies. He reports that it may create a conflict of interests as credit rating agencies may only issue new ratings in favour of the debt issuers. Nevertheless, in case of the performance of the debt issuer is suffered, credit rating agencies still reserve the right to issue unsolicited and independent opinion of the creditworthiness of the borrower in order to protect the investors' interests. As Bolton et al (2012) point out, debt issuers often pay for their designated credit ratings at the time of issuance and are the primary clients of the credit rating agencies, they may have discretion in purchasing the best possible rating from one of the credit rating agencies, and therefore, the actual credit ratings may be largely influenced by the primary clients of credit ratings. Nevertheless, Bolton et al (2012) mention that Cuomo Plan between New York State Attorney and the big three rating agencies is designed in order for the rating fees to be paid before the credit rating issuance, which reduces the incentives of the credit rating agencies to inflate their credit ratings to favour their paying clients, which are virtually the issuers of long-term debt.

The third criticism refers to the lack of competition in the credit rating market and the market is imperfect (Cheng and Neamtiu, 2009). The credit rating market is largely dominated by the big three, which are S&P's, Moody's and Fitch. As reported by Guttler (2011), S&P's and Moody's have a total market share of 80% in the credit rating market. The big three credit rating agencies are enjoying too much power, and therefore, it may lead to the lack of accuracy and timeliness in terms of the credit rating issuance. Nonetheless, Cheng and Neamtiu (2009) announce that under the regulatory enforcements and criticisms from the

credit rating market participants, the accuracy and timeliness of credit ratings have been improved simultaneously. In addition, Bolton et al (2012) report that the barriers to entry the credit rating market create market power for the credit rating agencies. Interestingly, Bolton et al (2012) argue that duopoly is less efficient than monopoly in the credit rating market, and the competition among credit rating agencies lead to rating inefficiency, because this would facilitate rating shopping compared to the time when there is only one credit rating agency.

Although there have been many criticisms on the accuracy and quality of credit rating, Jarrow and Xu (2010) report that the credit rating agencies still make significant contribution to the capital market and benefit the economy, as they help to reduce the information asymmetry and monitoring costs in the credit market. The credit rating agencies provide useful information about the creditworthiness of companies to outside investors and help the investors make informed decisions. As Kisgen (2006) states, credit rating provides useful information to the financial market, and also, credit rating is a signal of firm's quality. Therefore, the release of credit rating would reduce the information asymmetry between the managers and outside investors, and hence, it would further reduce the costs of borrowing because of the reduced information asymmetry. Furthermore, the changes in credit ratings can also influence the firm in terms of the access to the commercial paper market and interest rate on the issuance of public debt.

Arnold (2008) states that the change of credit rating, either upgrade or downgrade, is based on the likelihood the firms will be able to pay back their principal and interests of their issued debts and the extent the investors are protected in the events of default by the debt covenants. A firm's credit rating may be downgraded if a large amount of debt is issued. On the other

hand, if a large amount of equity is issued, the firm's credit rating may be upgraded following the equity issue. In addition, firms tend to trade-off between the benefits of rating upgrade and costs of rating downgrade, and between the benefits of investment opportunities and costs of rating downgrade. For example, if the debt issued is used to finance the project with expected significant future cash inflows, the credit rating of firm may not be downgraded. However, if the project is not expected to generate significant future cash inflows and is still financed by debt, the credit rating of firm may be downgraded and be placed on a negative outlook.

Although most managers want to have good credit ratings, however, in reality only very few firms have credit ratings such as AAA or AA, this is because of the reason that having good credit ratings requires the firms to include a substantial amount of equity in their capital structure, which can be very costly to the firms. Hovakimian et al (2009) report that firms tend to achieve target capital structure by benefiting the most from trade-off between benefits of debt tax shield +and costs of bankruptcy risks that allow them to pursue high credit ratings.

Recent literatures examine the effect of changes in credit ratings on the changes in capital structure. Kisgen (2006) investigates the effect of credit ratings on capital structure of firms, they find that firms that are near credit rating changes tend to issue less debt relative equity than firms that do not near credit rating changes, specifically, firms near changes in credit ratings issue around 1% less net debt relative to net equity as a percentage of total assets than firms that do not near credit rating changes. Kisgen (2006) suggests including credit ratings as one of the explanatory variables within capital structure framework to offer better and more accurate inferences of the capital structure of the companies. Kisgen (2009) finds that after credit rating downgrade, a firm is more likely to reduce leverage in order to regain the target

level of credit rating, and this effect is particularly stronger for the investment graded firms and firms with downgrades in the rating of commercial papers.

Other literatures investigate the impact of credit rating levels on the supply of debt capital. Sufi (2009) reports that the introduction of bank loan rating increases the use of debt for firms obtained such ratings, which lead to increases in the asset growth and capital expenditure of firms and real changes in investment policy. Moreover, Faulkender and Petersen (2006) find that the US firms with access to debt capital markets, as measured of having credit ratings, are significantly more levered than the firms without access to debt capital markets, and firms with access to bond markets use 35% more debt compared to other firms. Furthermore, Mittoo and Zhang (2010) examine the impact of bond market access, having credit rating, on capital structure of Canadian companies, they confirms the research finding of Faulkender and Petersen (2006) that bond market access is important for the capital structure of companies and also, they find that the impact of bond market access on capital structure is stronger for the firms with lower credit quality, because low quality firms tend to be more financial constraint than high quality firms, and therefore, they tend to enhance their financial flexibility and leverage by using the advantage of credit ratings to borrow in the bond market.

Recently, I find some investigations in the relationship between capital structure and credit rating in the UK market (Judge and Mateus, 2009; Judge and Korzhenitskaya, 2011; Naeem, 2012). Judge and Mateus (2009) and Judge and Korzhenitskaya (2011) examined whether the bond market access, as proxied by having credit rating, would affect the capital structure of the UK firms, and they confirm that the firms with bond market access have significantly more leverage on their capital structure than the firms without the access. Moreover, they look

at the effect of financial crisis on the relationship between capital structure and credit rating, and observe that the leverage difference between rated and unrated firms is greater during the financial crisis when the credit market is tightening, and looser when the credit market is loosening. Importantly, Judge and Mateus (2009) and Judge and Korzhenitskaya (2011) point out that firms that are highly dependent on bank loans would find themselves severely constrained during the financial crisis because of the shortage in bank loan supply, whereas firms with credit ratings are much better in terms of sourcing external funding due to their access to the external public debt market during the financial crisis period. Nevertheless, different from this study, Judge and Mateus (2009) and Judge and Korzhenitskaya (2011) did not consider the effect of the level of credit rating on the capital structure in the UK, and this study take the two main rating categories that are the investment grade ratings and speculative grade ratings into consideration. As the firms with investment grade ratings can borrow at more favourable terms than the firms with speculative grade ratings, and also, investment grade firms can have more access to the commercial paper and Eurobond markets, and therefore, I expect that the credit rating levels may also have different effect on the capital structure of firms, further to whether or not having a credit rating to have access to the market debts.

Moreover, Naeem (2012) complete a PhD thesis on the capital structure and credit rating in the UK. Naeem (2012) examines the effect of the level of credit rating and the changes of credit rating on the capital structure, and she finds that rated firms are more levered than the unrated firms, and higher rated firms and lower rated firms tend to have lower leverage than the mid rated firm, and also, she reports that firms do not change their capital structure when they near credit rating changes. However, Naeem (2012) did not consider the effect of recent

financial crisis on the influence of credit rating on capital structure, even though her sample period covers the period of financial crisis. Nevertheless, I expect the relationship between capital structure and credit rating may change significantly after the financial crisis, and therefore, this study considers the effect of financial crisis on the relationship between capital structure and credit rating.

This study examines the relationship between the capital structure and credit rating for the public limited companies in the UK. I construct two distinguished measures of credit rating in this study. First, I look at whether firms have credit ratings tend to be more levered. Second, I examine the firms that have credit ratings, about how the different levels of credit ratings affect the firm's capital structure, as a comparison between firms with investment grade ratings such as AAA to BBB-, and firms with speculative grade ratings such as BB+ to C.

The separation between ownership and control creates the conflict of interests between managers and external shareholders due to interests of different parties, and ultimately, the conflict of interests would lead to higher agency costs, which increase the cost of external financing significantly when the firms need external financing for their investments outside of internally generated fund. Therefore, the corporate governance aims to provide the compliance procedure for the companies to follow to alleviate the conflict of interests between managers and external shareholders, and whereas, good corporate governance practices should minimize agency costs, protect the interest and wealth of external shareholders, and reduce the risks of financial fraud and corporate abuse. As Lasfer (1995) points out, agency costs of debt are the main factors that influence the corporate costs of borrowing. Also, Florackis and Ozkan (2009) argue that firms with strong corporate

governance structure are able to raise more debt due to the reduction of agency costs from the conflict of interests between managers and shareholders. Moreover, Mande et al (2012) state that the reduction of agency costs tend to affect both of the equity and debt financing, and the agency costs significantly affect the cost of external financing. Therefore, it is very important for the firms to have effective corporate governance mechanisms in place, which aims to reduce the agency costs of corporate borrowing and helps the firms gain easier and better access to the external capital markets when they have external financing needs.

Previous studies examine the impact of corporate governance mechanisms, including ownership structure such as managerial share ownership and substantial shareholdings, and board characteristics such as board size and fraction of independent non-executive directors on board, on the capital structure of firms. For example, previous literatures find an non-linear inverted U-shaped relationship between debt ratio and managerial share ownership (Brailsford et al, 2002; Ozkan and Ozkan, 2004; Florackis and Ozkan, 2009), they argue that at low levels of managerial ownership, the interests of managers and shareholders tend to be aligned together, and hence, it would alleviate the conflict of interests between managers and shareholders and reduce the agency costs, which would lead to higher debt financing. Nevertheless, the managers tend to be entrenched at high levels of managerial share ownership, and entrenched managers tend to prevent the disciplinary function of debt and reduce the risk of bankruptcy as a result of taking excessive debt, which would lead to lower debt financing. In addition, Brailsford et al (2002) and Florackis and Ozkan (2009) report a positive relationship between debt ratio and substantial shareholdings, they argue that the substantial shareholders play a monitoring role to control the managerial consumption of perquisite in order to reduce the agency costs of debt, which would lead to higher debt

financing.

Moreover, Florackis and Ozkan (2009) find that the inverted U-shaped relationship between debt ratio and managerial share ownership tend to be weakened at high level of substantial shareholdings with presence of strong monitoring from substantial shareholders. As the disciplinary functions of substantial shareholders and external debt are similar, substantial shareholders substitute external debt in monitoring and controlling the managerial behaviour, and therefore, the corporate managers are less able to pursue sub-optimal level of debt or consume excessively to serve their personal interests with the presence of strong monitoring from institutional shareholders. Furthermore, Brailsford et al (2002) argue that the positive relationship between debt ratio and substantial shareholdings is weakened at high level of managerial share ownership, as the entrenched managers have incentives to prevent the monitoring from substantial shareholders and subsequently remove the significance of substantial shareholders.

Other studies examine the effects of different corporate governance characteristics on the capital structure of firms, such as the structure of the board, including board size, proportion of independent non-executive directors and audit committee members on board, independence of audit committee as well as CEO duality. Jensen and Meckling (1976) and Berger et al (1997) report a negative relationship between board size and debt ratio, they argue that managers tend to have more power as board size increases and have incentive to reduce the debt as a monitoring tool and also to reduce the risk of bankruptcy. Huyghebaert and Wang (2012) argue that the communication at large board are often time-consuming and inefficient. Also, Fu and Liu (2004) and Mande et al (2012) report that the fraction of independent

non-executive directors on board is positively related to the debt ratio, because independent non-executive directors have incentive to monitor the managerial behaviour, which lead to reduced conflict of interests between managers and shareholders and agency costs, and higher debt ratio.

Moreover, previous studies report that the fraction of audit committee members on board and independence of audit committee have positively effects on the debt ratio (Anderson et al, 2004; Mande et al, 2012), as the preliminary roles of audit committee are to ensure the true and fair view of company financial statements and oversee the compliance of financial reporting standards, the higher the fraction of audit committee members on board, and the greater the independence of audit committee would prove a better corporate governance quality that would reduce the agency costs of debt and increase the debt ratio of firms. Furthermore, previous studies argue that CEO duality creates greater conflict of interests between managers and shareholders (Shleifer and Vishny, 1986; Jensen, 1993; Abbott et al, 2003). They report that if the CEO of the company is also the chairman, he or she may enjoy too much power in influencing the company management and other corporate activities, and also, the entrenched CEOs have less incentive to monitor and control the managers compared to the case when different people fulfilling the roles of CEO and chairman in a company separately.

Further on, recent studies investigate the influence of corporate governance index, as a proxy for the overall corporate governance quality, on the capital structure of firms (Jiraporn and Gleason, 2007; Jiraporn et al, 2012; Mande et al, 2012). Jiraporn and Gleason (2007) and Jiraporn et al (2012) find an inverse relationship between corporate governance quality as

indicated by corporate governance index and debt ratio, because debt and corporate governance of firms often act as substitute of one another. In firms with weak corporate governance, more debt is needed to monitor the managerial behaviour to reduce the conflict of interests between managers and shareholders, whereas in firms with strong corporate governance, less debt is needed as corporate governance already play the disciplinary function to minimize the agency costs.

Mande et al (2012) argue that the probability of equity issues against debt issues increases as corporate governance quality increases, they provide empirical evidence that corporate governance and agency costs play important role in determining the external financing of firms, and in firms with strong corporate governance quality and low level of agency costs, the costs of external financing would also be reduced leading to higher external financing. While both of the equity and debt financing are influenced by the reduction of agency costs, Mande et al (2012) argue that the influence of agency costs on external financing is more prominent for equity issues than debt issues. Therefore, Mande et al (2012) suggest that firms should consider and trade-off between the benefits of equity issues against the costs of improving their corporate governance quality before the equity issuance.

There have been increasingly more studies on the influence of corporate governance on the capital structure of firms, and however, there are still areas that the previous studies did not cover. Specifically, none of the previous studies have investigated the effect of the overall corporate governance index on the capital structure of the UK firms, which this study aims to investigate. Most of the previous studies examine the effect of corporate governance on capital structure by investigating the influence of the individual corporate governance variable

on the capital structure, until recently, studies investigate the relationship between the overall corporate governance index and capital structure (Jiraporn and Gleason, 2007; Jiraporn et al, 2012; Mande et al, 2012). As Mande et al (2012) argues, the corporate governance mechanisms act as complement of each other in terms of monitoring and controlling the management of firms, and the corporate governance index gives better explanation for the overall corporate governance quality of firms rather than a collection of individual corporate governance mechanisms. As none of the previous literatures examine the effect of the overall corporate governance quality as indicated by the corporate governance index on the capital structure of firms in the UK, this study aims to generate insight into the relationship between capital structure and overall corporate governance quality for the UK firms.

Furthermore, due to the recent financial crisis in 2008, UK firms experience severe constraints in accessing to the external funding, especially from banks. Internally, the corporate governance of firms would influence the conflict of interests between managers and shareholders and agency costs of external funding, and externally, it would provide a signal of the firm quality to the outside investors. During the financial crisis, firms compete to obtain their external funding especially during the period of limited credit supply, such as bank loans, and therefore, I expect that firms tend to improve their corporate governance quality to a better standard, and only firms with strong corporate governance quality are able to obtain their external funding during the financial crisis compared to the period before the financial crisis. Nevertheless, none of the literatures have looked at the impact of the recent financial crisis on the relationship between capital structure and corporate governance in the UK, and this study covers not only the whole sample period of 2005 to 2011, but also, it divides the whole sample period of 2005 to 2011 into two sub-sample periods of 2005 to 2007 and 2008

to 2011, to take the effect of the financial crisis on the relationship between capital structure and corporate governance into consideration.

The UK Corporate Governance Code set out by the Financial Reporting Council provided a principle based approach for good corporate governance practice for the UK public limited companies in the London Stock Exchange. The code suggests that the board must have a clear division between the responsibility for running the board consisting of non-executive directors and the responsibility for running the daily business of the company. Rayton and Cheng (2004) point out that the introduction of corporate governance code in the UK has a positive influence on the corporate governance structures for the companies. According to GMI corporate governance ratings by countries in 2010, UK has been ranked as the country with the best corporate governance practice with an overall rating score of 7.6, followed by Canada, Ireland, US and New Zealand.

The remainder of this chapter is organised as follows. The next section reviews the literatures and develops the hypotheses. After that, I describe the methodology. I present and discuss the results and conclude in the end.

3.2 Literature Review and Hypotheses

The empirical literatures on the relationship between capital structure and credit rating are still limited but have recently become increasingly more popular. Kisgen (2006) investigates the relationship between the changes in capital structure and expected changes in credit rating and provides one of the first research findings showing that credit rating directly affect the capital structure of firms, he finds that the firms near a credit rating upgrade or downgrade tend to

issue less debt relative to equity in an attempt to either achieve a rating upgrade or avoid a rating downgrade. He defines the firms near a credit rating upgrade or downgrade by the firms with a plus or minus designation in their credit rating (BBB+, BBB-), whereas firms without a plus or minus designation are considered as not near a credit rating change (BBB). In other words, he concludes that the firms that have been designated with a plus or minus credit rating would issue less debt relative to equity than the firms that do not have a plus or minus credit rating. Nevertheless, a potential drawback of his measurement is that it may cause selection bias as including firms with plus and minus credit ratings will effectively exclude firms in the middle of the board ratings such as AA and BB. In addition, it is difficult to judge the reasons why firm in the middle of a board rating is not near a rating change, as credit rating agencies might still upgrade or downgrade a firm that in the middle of their board ratings.

Further to the study of Kisgen (2006), Michelsen and Klein (2011) investigate how credit rating concerns affect the managerial decision on the capital structure and provide a more accurate measure of the imminence of rating upgrade and downgrade by using the rating outlook from S&P's. As they mention, rating outlook is used to assess the future direction of the long-term credit rating over the intermediate period from six months to two years, and similar to the level of credit rating, the level of rating outlook is also determined by the firm's key economic and fundamental conditions. Firm near a rating upgrade is likely to be placed at a positive rating outlook and firm near a rating downgrade is likely to be placed at a negative rating outlook. In consistent with Kisgen (2006), Michelsen and Klein (2011) find that the credit rating concerns affect the manager's capital structure decisions for both the European and US firms in their sample. Specifically, they find that for the companies with proximity of borrower credit rating change, either a rating upgrade or downgrade, tend to issue 1.8% less

net debt relative to net equity as a percentage of total assets than the companies without a near term credit rating change in the subsequent year following a new rating outlook. Also, they report that the relationship between the future expected change in credit rating and actual change in capital structure is more significant for the firms with a negative rating outlook, as these firms tend have a more conservative capital structure policy and issue 2.1% less net debt relative to net equity in the next year following the announcement of a new credit rating outlook.

Furthermore, Kisgen (2006) and Michelsen and Klein (2011) suggest that the relationship between the future expected changes in credit rating and actual changes in capital structure is more significant for the firm near a rating change from the investment grade rating to the speculative grade rating or a change from the speculative grade rating to the investment grade rating, which are BBB- or BB+ rated according to S&P's and Fitch's credit rating scales, and Baa3 or Ba1 rated according to Moody's credit rating scale. The firms that are near a change around the investment grade rating or the speculative grade rating are more likely to issue less net debt relative to equity to prevent a further rating downgrade or to achieve a further rating upgrade. Moreover, Kisgen (2006) and Michelsen and Klein (2011) suggests that this relationship has incremental and economically stronger power for the firms, which their credit ratings are likely to affect their access to the commercial paper and bond markets.

Due to the separation of ownership and control, the agency theory with regard to the conflict of interests for the principal agent relationship between managers and shareholders has been a central topic in the corporate finance literatures. The developments of corporate governance studies is mainly grounded on agency cost of manager-shareholder conflict, as the managers

may only act in the partial interests of shareholders and may pursue their own interests to the detriments of shareholders. As Mallin (2004) points out, there are a number of different dimensions of conflict of interests between managers and shareholders. First, managers may misuse their position to pursue their personal interests and engage in value decreasing activities, for example, managers misuse their power for pecuniary and engage in excessive consumption of perquisite to the detriment of external shareholders, and also, managers may invest in uneconomic projects and waste free cash flows in the firms with large amount of free cash flows, which leads to agency costs of free cash flow problems (Jensen, 1986). Second, managers may not take appropriate level of risk to serve shareholders because managers and shareholders have different attitude about the risks. Third, there is an information asymmetry problem between managers and shareholders, as they possess different levels of information, which mean that managers often have more knowledge about the company than shareholders, and hence, shareholders are often at a disadvantage because managers have more information. Fourth, Mallin (2004) points out that agency costs may result from the costs of monitoring or controlling managers in order to prevent their misuse of managerial power or corporate abuse, including overpayment of managers for their poor performance or losing valuable investment opportunities, and to protect the interests of shareholders that are mostly wealth maximization. The ultimate goal of corporate managers is to maximise the wealth of shareholders, however, as the potential conflicts between managers and shareholders in modern firms, the interests of managers and shareholders often deviate from one another, which results in a large amount of agency costs in firms without effective monitoring and controlling mechanisms to manage the conflict of interests between managers and shareholders.

As the principal-agent problems between managers and shareholders because of the

separation of ownership and control, it has been argued that there are several ways to alleviate the conflict of interests, including using financial leverage and corporate governance mechanisms, which will reduce the agency costs that would help to internally increase firm value and retained earnings while decreasing costs (Gompers et al, 2003), and externally secure better and cheaper corporate financing such as equity and debt (Mande et al, 2012) . By investigating whether corporate governance has a great influence on firm's choice between equity and debt and capital structure composition, Mande et al (2012) argue that firms should consider investing in their corporate governance mechanisms and to reduce agency costs between shareholders and managers before raising external capital from equity and debt capital markets. Mande et al (2012) find that the benefits of improving corporate governance before issuing external financing is more pronounced for the firms which agency costs are more acute among others.

Many previous literatures documented that leverage helps to reduce agency costs (Jensen, 1986; Firth, 1995; Jiraporn and Gleason, 2007; Jiraporn et al, 2012). Jiraporn and Gleason (2007) report that debt can allay agency costs in different ways. First, the increase of debt financing would decrease the equity base of the company and hence, the debt financing would increase the managerial ownership of equity, and managerial ownership can mitigate agency costs (Brailsford et al, 2002; Ozkan and Ozkan, 2004), because the interests of managers are better aligned with the wealth maximization interests of shareholders when the managerial interests increase. Second, the increase of debt financing increases the potential risks of bankruptcy and increases the cost of bankruptcy and reorganization, and it also increases the probability of dismissal of managers, as argued by Jiraporn and Gleason (2007), the increase of bankruptcy risks and fear of dismissal cause the managers to reduce their consumption of

perquisite and increase their motivation for better performance. Third, the increase of proportion of capital structure being financed by debt and also interest payments associated with taking additional debts help to solve the free cash flow problems and reduce the agency cost of free cash flows (Jenson, 1986; Lasfer, 1995; Jiraporn and Gleason, 2007), and therefore, it would effectively reduce the amount of free cash available and the managers are less able to engage in excessive consumption of perks based on the available free cash flows.

Other literatures relate the conflict of interests between managers and shareholders and outline several corporate governance mechanisms that allay the agency costs. Previous studies look at the individual internal and external corporate governance mechanisms (Short et al, 2002; Ozkan and Ozkan, 2004; Florackis and Ozkan, 2009), including managerial ownership, institutional ownership and other characteristics of the board such as board size, fraction of independent non-executive directors on board, independence of audit committee and power of chief executive director on board. For example, Short et al (2002) report a positive relationship between debt ratio and managerial ownership and a negative relationship between debt ratio and institutional shareholding. Further on, Florackis and Ozkan (2009) find a significant non-monotonic inverted U-shaped relationship between debt ratio and managerial ownership, and however, this relationship exists only in the firms with weak corporate governance structure in place.

Recently, a number of studies looked at the corporate governance mechanisms as an aggregate version of different corporate governance provisions (Gompers et al 2003; Bebchuk et al, 2008; Jiraporn and Gleason, 2007; Jiraporn et al, 2012; Mande et al, 2012). For example, Gomper et al (2003) use a governance index as an incidence of 24 different corporate

governance rules, and they find that a stronger corporate governance structure is associated with higher firms value, higher profitability and higher growth in sales. Moreover, Jiraporn et al (2012) examine the empirical relationship between capital structure and corporate governance, they use a broad governance index comprising of 51 corporate governance measures obtained from institutional shareholder services, and report an inverse relationship between capital structure and governance quality represented by the broad governance index.

Mandel et al (2012) argue that corporate governance mechanisms often complement each other, and the aggregate corporate governance index provides the explanations better than a collection of individual corporate governance mechanisms. Nevertheless, one of the potential disadvantages of this approach is that using corporate governance index as an aggregate version of corporate governance mechanisms potentially neglect the differences in the proportional effects of the individual corporate governance provisions, because the power of the effects of different corporate governance mechanisms may be different from a small to a great extent.

Corporate governance is to ensure the managers perform their duties and act at the best interests of shareholders, and thus, corporate governance is implemented to allay the conflict of interests between managers and shareholders and minimize the agency costs. Corporate governance determines capital structure as the level of debt used by the firm depends largely on the effectiveness of corporate governance in place. Nowadays, there are two theoretical hypotheses around the corporate governance literatures that relate to capital structure, which are outcome hypothesis and substitution hypothesis.

As argued by Jiraporn et al (2012), the outcome hypothesis of corporate governance proposes that leverage is an outcome of the corporate governance mechanisms. Firms with the lowest corporate governance quality tend to incur the highest level of agency costs. Agency costs originate from the conflict of interests between managers and shareholders, as managers are likely to place their own interests ahead of the interests of shareholders and to exploit the values from shareholders, such as making unprofitable investments, excessive and unrealistic performance bonus, and consumption of perks using free cash flows. On the other hand, shareholders want to maximise their own wealth, through urging management making profitable investments and maximising the firm value. The interests of managers and shareholders are not aligned together, which results in the conflict of interests between managers and shareholders and agency costs.

Debt is used as a disciplinary mechanism to monitor the managerial behaviour and to reduce the agency costs. In firms with weak corporate governance, the managers tend to pursue sub-optimal level of debt as the bankruptcy costs associated with excessive debt level, and also, the managers may not want to impose additional debt and interest burdens and constrain their power of exploitation of the value from shareholders, as a result, managers of the firms with weak corporate governance mechanisms are likely to make capital structure choice to pursue the low level of debt and to be free from financial constraints. Therefore, the outcome hypothesis suggests a positive relationship between capital structure and corporate governance. As a result of the differences in terms of the interests between managers and shareholders, firms with strong corporate governance tend to pursue high level of financial leverage, and firms with weak corporate governance tend to pursue low level of financial leverage.

As Jiraporn et al (2012) point out, the substitution hypothesis of corporate governance posits that leverage is a substitute for corporate governance mechanisms. There are two arguments of the substitution hypothesis as the firms use debt financing as a substitution of corporate governance mechanism for the firms with low governance quality and another argument is that the firms use debt financing as a reputation mechanism to raise external fund.

The first substitution hypothesis argues that debt acts as a controlling mechanism to reduce agency costs, which is the same as other corporate governance mechanisms, and hence, debt and corporate governance mechanisms act as substitute of each other in the firms. Therefore, in firms with weak corporate governance quality, debt is used to compensate the weak corporate governance to monitor the management and protect the interests of shareholders, and thus it has been argued that there is an inverse relationship between capital structure and corporate governance.

The second substitution hypothesis applies in the circumstance when the firms need to raise external funding from capital market. In order to reduce the costs from securing external capital, firms must establish good reputation for not or moderately expropriating shareholders, and hence, taking additional debt and making interest payments would effectively reduce the amount of free cash flows left to consume by the managers (Jiraporn and Ning, 2006), and also, carrying debt sends a credible signal to the capital markets that the firms is able to serve their debt and interest payment with its funding available through a scheduled timetable. Therefore, the need for establishing good reputation is the strongest for the firms with weak corporate governance quality, while raising external funding from debt and equity capital

markets. On the other hand, for the firms with strong governance mechanisms in place, the need to establish a good reputation is the weakest. The second substitution hypothesis suggests a similar inverse relationship between capital structure and corporate governance as the first substitution hypothesis.

3.2.1 Capital Structure and Credit Rating

Having a credit rating is a necessity for the firms to have access to the market debts[6], such as Eurobond and commercial papers. Mittoo and Zhang (2010) suggest that firms with bond market access, defined as having a credit rating, have substantially higher leverage than firms without bond market access, as the cost of private debt and bank loan is significantly higher than the cost of corporate bond because of the monitoring costs and information collection costs, and hence firms prefer long-term bond to short-term debt to finance their investment opportunities.

Similarly, Faulkender and Petersen (2005) argue that because the long-term bonds have lower cost of debt, larger size of bond issue and longer maturity compared to the short-term loans, therefore, firms tend to choose long-term bonds over short-term loans and firms with bond market access are 50% more levered than the firms without access. In addition, Faulkender et al (2012) argue that firms with credit ratings adjust their capital structure much faster than the financial constrained firms through accessing to the bond markets when they are under levered, which supports that the firms with bond market access are able to acquire cheaper and easier source of capital compared to the firms without bond market access.

[6] Market debt is used as a term opposite to the institutional debt, institutional debt often refers to the debts that are obtained from the financial institutions, such as banks, insurance companies, pension funds, and unit trusts.

Consistent with Faulkender and Petersen (2005) and Mittoo and Zhang (2010), Hovakimian et al (2009) show that firms with credit ratings tend to be more levered than firms without credit ratings because of the better access to the debt markets with lower cost of borrowing. They argue that credit rating can be viewed as a descriptive statistics that captures various element of company's capital structure, which include a number of firm characteristics such as debt ratio, the maturity structure of debt and cash flow volatilities. Specifically, they find that firms with higher credit ratings tend to be larger in size, have higher growth opportunities and more tangible assets compared to their industry peers. Furthermore, Hovakimian et al (2009) suggest that the firms have target credit ratings similar to target capital structure, which may subsequently influence the corporate financing decisions. Firms that are below or above target credit ratings, tend to make security issuance and repurchase decisions to reduce or increase their financial leverage, decrease or increase their dividend payouts, and make fewer or more acquisitions.

In addition, Leary (2009) reports that large firms with bond market access tend to issue more long-term debt than the firms without bond market access. He also argues that during a period of limited credit and constrained access to the bank loans, small firms tend to reply more on equity financing and large firms tend to issue long-term debts as substitute for the bank loans.

Moreover, Van Binsbergen and Graham (2011) capture the supply effects of credit ratings and report that the firms with credit ratings are significantly more levered than the firms without credit ratings. The cost of debt gives an idea to the investors about the riskiness of the firm and riskier firm often have higher cost of debt. Van Binsbergen and Graham (2011) find that having a credit rating reduces the cost of debt and report that the firms with credit ratings have

10% more leverage as measured by debt ratio than the firms without credit ratings. They state that the basic reason for the rated firms to be more levered is that having a credit rating increases the supply of available source of capital, and also it decreases the cost of debt. Van Binsbergen and Graham (2011) assert that the reduced cost of debt is partly because of the reason that the credit rating provides useful information to the outside investors and reduces the information asymmetry between the company and outside investors. Therefore, the supply of credit rating decreases the costs of information asymmetry and cost of debt, and hence increases the financial leverage.

Judge and Mateus (2009) report that firms with long-term debt ratings are twice as levered as firms without ratings, given that credit rating provides firms with public debt market access, and therefore by having credit rating increase the source of funding for the firms willing to raise their external capital. Moreover, they argue that during the 2008 financial crisis, the firms that are highly dependent on the banks for external funding would find themselves financially constrained for not being able to finance their investment opportunities leading to substantial decreases in their values. However, the firms with long-term debt ratings with access to the public debt markets would be able to finance their investment opportunities successfully and would not be significantly affected by the shortage of bank lending during the financial crisis. Further on, Judge and Mateus (2009) state that having long-term debt ratings are useful not only in terms of the increase in the supply of debt, but also it facilitates banks use the long-term debt ratings to calculate their capital allocation requirements, and make the firms more attractive lending customers for the banks, and therefore, the use of long-term debt ratings is expected to grow significantly in the future.

Judge and Korzhenitskaya (2011) argue that access to public debt market, as indicated by having credit rating, is associated with higher debt ratios after controlling for the demand side factors such as firm characteristics. And also, they assert the positive association between debt ratio and public debt market access is the strongest during the period of credit crisis, such as the constrained bank lending during the period of 2008 financial crisis. Judge and Korzhenitskaya (2011) state the difference in leverage between firms having credit ratings and firms without credit ratings is greater during the financial crisis when credit market is tightening, and is smaller when credit market is loosening, and the debt market segmentation between short-term debt market and public debt market is not very important when banks are willing to lend to firms, whereas public debt market access become extremely important especially during the period of financial crisis and those firms without access to public debt market may find themselves financially constrained for not being able to source their funding to finance their projects from external sources.

Furthermore, Sufi (2009) investigates the effect of introducing new bank loan ratings on the company's financial and investment policy. He reports that the issuance of third party bank loan ratings increases the supply side of available debt capital. Firms with bank loan ratings increase their use of debt capital, and also they experience increases in their assets growth and cash acquisitions. Specifically, Sufi (2009) finds that the positive relationship between the short-term loan credit ratings and the amount of debt used is more significant for the firms with low credit quality and the firms without long-term debt credit ratings.

The bankruptcy code in the UK is stricter in terms of the creditor's protection in comparison with the US market, and the UK firms prefer short-term debt or equity to long-term debts to

finance their investments, because not paying long-term debt interests on time may result in an immediate liquidation by the creditors. However, US firms have more relax bankruptcy code and they prefer to finance their investment opportunities with long-term debt because it is cheaper than short-term bank loans, which would encourage the US firms to obtain their credit ratings from the rating agencies as credit rating is a necessity to have access to the bond markets. As a result, I would expect the amount of rated firms in the UK is lower than the US, and I find that only 16.5% of the sample firms in the UK have credit ratings, compared to 18.6% rated firms in the US (Hovakimian et al, 2009). Although the credit rating increases the supply of debt capital, UK firms may prefer short-term debt to long-term bond, and therefore, it might be possible that the relationship between financial leverage and credit rating in the UK may not be as significant as the US market, or even insignificant.

H_1: Firms with credit ratings are more levered than firms without credit ratings.

3.2.2 Capital Structure and Credit Quality

Recent literatures examine the empirical relationship between the levels of capital structure and the different levels of credit rating. Mittoo and Zhang (2010) find that Canadian firms with investment grade ratings are less levered compared to the firms with speculative grade ratings. The firms with investment grade ratings are often more financially flexible than the firms with speculative grade ratings, which means that they can respond more quickly to the cash flow stocks and investment opportunities with greater financial flexibility. Nevertheless, these firms are also concerned about their credit ratings while raising external capital, such as debt or equity, as most of the debt contracts, for example, commercial paper and Eurobond, are conditional upon a minimum level of credit rating. Therefore, the investment graded firms

are more cautious about their credit ratings by maintaining target minimum levels of credit rating, thus, they have propensity to maintain lower than optimal financial leverage, which is consistent with the findings of Graham and Harvey (2001), Kisgen (2007) and Kisgen (2009) that the firms have target minimum levels of credit rating and they work hard to maintain it.

On the other hand, Mittoo and Zhang (2010) report that the firms with speculative grade ratings are significantly more levered than the firms with investment grade ratings, because speculative firms tend to issue speculative bonds to enhance their financial flexibility to react to investment opportunities and to take advantage of speculative bonds over short-term bank loans, as speculative bonds have less restrictive debt covenants, less collateralizations and longer maturities compared to short-term bank loans (Rajan and Winton, 1995; Gilson and Warner, 1997). Gilson and Warner (1997) report that after a period of decline in operating performance, speculative firms tend to issue speculative bonds rather than using their retained earnings to pay back their bank loans, since speculative bond issues have less restrictive debt covenants, require less safe assets and have longer maturities compared to short-term bank loans, by which would reduce the bankruptcy risks and increase the financial flexibility to meeting their financing needs. Furthermore, Gilson and Warner (1997) state that speculative bond issues convey negative credit information to the stock market, which could cause share prices to decline. Nevertheless, Gilson and Warner (1997) point out that the benefits of increase in financial flexibility will outweigh the cost in decrease in share price, therefore, speculative bond issue may still be considered as a better option for the firms with lower credit ratings.

However, Barclay and Smith (2005) assert that short-term bank loans have least out of pocket

transaction costs and least information costs and occur almost regularly among different sources of external capital, such as equity, long-term bonds and short-term loans. Therefore, short-term bank loans could be considered as a better option compared to speculative bonds. Nonetheless, despite of financial flexibility and credit rating that are suggested by Graham and Harvey (2001) and Bancel and Mittoo (2004), the restrictiveness of debt covenants would also be a very important consideration for the managers while issuing debt, for example, the higher probability of default on borrowings because of a restrictive debt covenants. Rajan and Winton (1995) argue that short-term debt covenants give lenders too much discretion leading to excessive liquidation, and they state that short-term debt covenants are more detailed and restrictive than long-term public debt covenants, which suggests that managers would prefer long-term debt to short-term debt after a period of decrease in the operating profit because of the concerns of the restrictiveness of debt covenants, which is consistent with the findings of Gilson and Warner (1997) and Mittoo and Zhang (2010).

Interestingly, Hovakimian et al (2009) investigate how do managers target their credit ratings and report that firms below the target credit ratings tend to reduce their financial leverage by security issuance and repurchase decision in order to achieve their target ratings. However, firms above their target credit ratings tend to increase their leverage to meet their target ratings. This empirical evidence supports the findings of Gilson and Warner (1997) and Mittoo and Zhang (2010) that the firms with better ratings tend to have lower leverage and the level of credit rating is negatively related to the level of financial leverage. In addition, Hovakimian et al (2009) find a negative relationship between the credit rating level and the dividend payout ratio, and a negative relationship between the credit rating level and the cash acquisition, because both of the dividend payout and cash acquisition are likely to reduce the

firm's cash balance and increase the leverage ratio. They also announce that larger firms and firms with more tangible assets that can be collateralized are likely to have higher credit ratings, because these firms are known as having less bankruptcy risk and better access to the debt markets.

Furthermore, Martin and Titman (2008) evaluate how managers determine their project debt capacity. They report that the amount of debt the company can undertake is determined by whether undertaking additional debt would reduce the firm's credit rating. They suggest that manager judges whether the company have excessive or too little amount of debt on their capital structure by looking at the firm's credit rating. If they feel that the credit rating may be downgraded, they are likely to be reluctant to finance their investments with additional debt. Martin and Titman (2008) find that the level of riskiness of the new investment opportunities plays an important role for the managers determining the debt capacity and capital allocation of the project, for example, if the project is considered to be very risky, as measured by the volatility of project's future cash flows (Martin and Titman, 2008; Hovakimian et al, 2009), the project may be undertaken with less debt financing but with more equity financing. However, Martin and Titman (2008) mention that the manager should consider if the project provides diversification benefits to the entire portfolio of the company's investments, which may reduce the volatility of the project's future cash flows, the company may finance its investment with more debt if it provides diversification benefit or for hedge purpose. Besides, if the investment can be sold relatively easily with readily cash flows, the company can have more debt capacity as this could avoid the default risk for not able to service the debt in the event of financial distress. Furthermore, Martin and Titman (2008) report that the companies can always have a clear idea about the debt capacity they can undertake for large investments

by consulting either the investment banks or the credit rating agencies. To summarize, the findings of Martin and Titman (2008) add additional support to the empirical literatures that firms with lower levels of financial leverage have higher levels of creditworthiness and credit ratings.

Contrary to the results of Gilson and Warner (1997) and Mittoo and Zhang (2010), Tang (2009) finds that the firms that are better rated are have higher leverage than the firms that are lower rated, they argue that the firms with higher credit ratings have easier and cheaper access to the bond market and lower cost of borrowing, and hence, they tend to take these advantages and issue a greater amount of long-term debt in comparison with the firms that have lower credit ratings. Also, Mizruchi and Stearns (1994) use credit rating as a proxy for the cost of capital, they argue that firms with higher credit ratings tend to have lower cost of capital and lower probability of financial distress, and therefore, sustain higher leverage. Besides, Billet et al (2007) assert that firms with lower credit ratings tend to have a higher amount of restrictive debt covenants, such as restriction in issuing further debt, which implies that firms with lower credit ratings may be more expensive in issuing external debt. Moreover, as a Financial Times article by Nakamoto (2012) states, the possible one notch downgrade in the credit rating of Nomura would put Nomura one notch above the junk (i.e., BBB-), which would place Nomura in an “extremely difficult situation in terms of its funding costs”, this report indicates that the credit rating is an extremely important consideration by the debt issuer in terms of its funding costs.

Bongaerts et al (2012) report that regulatory authority may mandate the financial institutions for holding much more reserve while issuing speculative grade corporate bonds compared to

the investment grade corporate bonds, which means that speculative grade corporate bonds are more risky and have more stringent requirements to issue compared to investment grade corporate bonds. Therefore, the firms with speculative grade ratings are less likely to issue speculative grade bonds because of stricter financial requirements once this regulation is announced and implemented in the future.

The credit rating in the UK does not have a very long history. The credit rating agencies in the US was established over a century ago, whereas the operations of credit rating agencies in the UK market only started at around 1980s. The short history in the credit rating agencies in the UK may lead to the significant differences in the quality of the rated firms in the UK and US. Batten et al (2004) find that around 40% of the total rated firms have speculative grade ratings, whereas the data from European Commission shows that only less than 10% of the total rated firms have speculative grade ratings in Europe, which is significantly lower than the amount of speculative grade ratings in US. Batten et al (2004) argue that in European countries, credit ratings are mainly acquired by large and creditworthy firms, whereas small and medium firms also have tendency to obtain their credit ratings in the US. In the present study, the amount of speculative grade ratings occupies approximately 18% of the total rated firms, and investment grade ratings are 82% of the total rated firms. Therefore, it can be seen that firms obtain their credit ratings are predominantly large firms in the UK, most of these firms are creditworthy firms and have investment grade ratings.

As Elkhoury (2008) points out, S&P's announces that they have not issued any unsolicited ratings outside of the US, and Moody's contends that they have not issued unsolicited ratings within Europe, and thus, most of the UK corporate credit ratings are solicited ratings and very

few firms have unsolicited ratings, whereas the US credit ratings comprise of a relatively higher proportion of unsolicited ratings than the UK market. As discussed earlier, credit rating agencies will only issue unsolicited ratings when they feel that the rating issuers have higher financial or credit risk in order to protect the interests of the creditors. Moreover, firms issue solicited ratings have opportunities to negotiate a better levels of credit rating, which facilitate rating shopping. Therefore, one can certainly anticipate that most of the unsolicited ratings are significantly lower than solicited ratings, and UK firms have relatively higher levels of credit ratings compared to the US firms, which is in line with that most of the UK firms within the sample of rated firms are investment grade firms.

Furthermore, the UK bankruptcy code is stricter in creditor's protection compared to the US bankruptcy code. Firms operate in countries with strong creditor protection tend to have lower leverage than their counterparts, and the strong creditor protection may limit the firm to have access to the external debt (Acharya et al, 2011). Most of the UK firms have more tendency in choosing short-term bank loans or equity rather than long-term debts for the risk of being liquidated by the creditors for not paying the long-term debt interest promptly. Nonetheless, the US firms may prefer long-term debts to short-term bank loans and equity because of the lower cost of borrowing and less restrictive debt covenants associated with long-term debts. Therefore, it is expected that only large and creditworthy firms are able to have access to the bond markets in the UK as a result from the more stringent credit protection.

The UK firms with investment grade ratings are mainly creditworthy firms, which consist a majority of the sample of rated firms. In comparison with speculative grade firms, investment grade firms tend to have lower costs of borrowing, and are able to have better access to the

external debt markets, especially the long-term debt market. As most of the UK firms are investment grade firms, speculative grade firms can easily be identified and are likely to have higher costs of borrowing and probability of financial distress, and they tend to follow a more conservative debt policy to avoid further increase in the costs of external financing. I expect that the UK firms with investment grade ratings tend to be more levered than firms with speculative grade ratings. The second hypothesis is as follows.

H_2: Firms with investment grade ratings (i.e., AAA to BBB-) are more levered than firms with speculative grade ratings (i.e., BB+ to C).

3.2.3 Capital Structure and Corporate Governance Index

I include an integrated corporate governance index including five different aspects of the board characteristics, including board size, percentage of independent non-executive directors on board, percentage of audit committee members on board, independence of audit committee and power and influence of CEO, and their values equal to either 1 or 0, and thus, the corporate governance index equals to the sum of the total scores of the corporate governance characteristics, and the range of the value of the corporate governance index is from 0 to 5. Many studies have adopted the use of corporate governance index as a measure of the total effect of the corporate governance mechanisms on their dependent variables (Gompers et al, 2003; Bebchuk et al, 2008; Chen et al, 2010; Renders et al, 2010; Jiraporn and Gleason, 2007; Jiraporn et al, 2012; Mande et al, 2012), and the reason for calculating the corporate governance index in this study is because the corporate governance mechanisms often act as complement of each other, and the integrated corporate governance index gives better explanations rather than a collection of individual governance mechanisms (Mande et al,

2012). In the following sections, I discuss the relevant literatures in relation to several corporate governance mechanisms used in this study, and also the literatures in terms of the corporate governance index that is used as one of the corporate governance metrics in this study.

Board Size

Berger et al (1997) suggest that board size is negatively associated with debt ratio, because the managers tend to become more entrenched when board size increases and they tend to become more conservative and maintain lower debt ratio when they have long-term contracts, small amount of remuneration and weak monitoring from institutional shareholders. Besides, Jensen and Meckling (1976) and Yermack (1996) argues that the communication on large boards are cumbersome and inefficient, the manager's fear of dismissal decreases as board size increases, and the managers have more freedom in pursuing their own interests in large board. Yermack (1996) also finds that the profitability decreases as board size increases, there is a positive stock price reaction when the company announces board reduction and a negative reaction on stock price when the company decides to expand board size, which indicates that large boards are often inefficient in terms of monitoring, and hence, large board increases the agency costs of debt and decrease the amount of debt on capital structure. Furthermore, Huyghebaert and Wang (2012) argue that small boards are more effective in terms of the communication, coordination and decision making than large boards, and also, they state that large boards may have low individual motivation, and thus they would reduce individual commitment and participation by the board members in their decision making.

On the contrary, Anderson et al (2004) argue that large board provide greater monitoring of

financial accounting process, which would reduce the cost of debt financing and increase the debt financing on capital structure. Also, Chaganti et al (1985) suggest that large boards that have a breadth of services and expertise are more valuable than small boards. Moreover, other literatures argue that large boards can commit more time to monitor the management (Monks and Minow, 1995; Lipton and Lorsch, 1992). It is expected that board size is negatively related to the corporate governance quality and debt ratio of firms. I give a score 1 for the good corporate governance practice if the board size equals to or less than the median value of the board size in my sample, 0 otherwise.

Independent Non-executive Directors

The UK Corporate Governance Code sets out standards to facilitate good corporate governance practices, in regard to board leadership, effectiveness and relation with its shareholders. In the code, it points out that at least half of the board should comprise of independent non-executive directors excluding the chairman, who is deemed to be independent upon the appointment to this position. In terms of the small companies, they should include at least two independent non-executive directors on their board. The code requires the companies to identify clearly if each of the non-executive directors is considered as independent or not, and the companies should include this information in their annual reports published at the end of the each fiscal year.

Fu and Liu (2004) suggest that if the proportion of non-executive directors on board is more than two thirds, the corporate governance quality of firm is perceived as optimal, and therefore, lower agency costs of debt often leads to higher debt ratios. In addition, Mande et al (2012) argue that a higher proportion of non-executive director on board is associated with

better corporate governance quality, because independent non-executive directors have greater incentives to monitor the performance and behaviour of managers, which would alleviate the principal-agent conflicts between managers and shareholders and act as the safeguard for the external shareholders to protect their interests and also monitor the managerial consumption of perquisite, and therefore, they employ a 60% of non-executive directors on board as a threshold for good corporate governance practice. Furthermore, Huyghebaert and Wang (2012) suggest a positive relationship between the fraction of independent non-executive directors and firm value, as the independent non-executive directors are expected to provide expert knowledge and exert monitoring power to the management to ensure the judgement on board and decision making to maximise the value of the firm.

Frank et al (2001) argue that the UK non-executive directors on board often play advisory roles and do not actively monitor the managerial behaviour because of the poor implementation of fiduciary responsibilities over the non-executive directors in the UK, and hence, the managers tend to pursue their own political interests further to the detriments of external shareholders. As Mallin et al (2005, p.535) state, fiduciary responsibility is "the responsibility to act in the best interests of a third party, generally the beneficial, or ultimate owners of the shares." However, as a comparison to the UK non-executive directors, Berger et al (1997) state that the US non-executive directors tend to monitor more effectively to limit the managerial consumption of perquisite in the US economy.

As discussed, it is expected that the presence of independent non-executive directors on board is positively related to the corporate governance quality and the debt ratio of the firms. I give a score 1 for the good corporate governance practice if the percentage of independent

non-executive directors on board equals to or greater than 60%, 0 otherwise.

Audit Committee Members

The UK Corporate Governance Code stipulates that the board should establish a formal and transparent audit committee in order to apply the financial reporting and internal control principles and maintain effective relationship with the company auditors. The code sets out that the companies should nominate an audit committee of at least three members in large companies and at least two members in small companies, and all of whom should be independent non-executive directors, and out of the audit committee members, at least one member must have recent and relevant financial expertise and knowledge.

In addition, Anderson et al (2004) report that increase in audit committee members involving in protecting and monitoring the financial reporting standards of companies would lead to the increase in corporate governance quality, which effectively result in greater accounting transparency and lower cost of debt, and therefore resulting in the increase in debt financing on the capital structure. Anderson et al (2004) also argue that firms with a larger number of audit committee members are more willing to commit more time and resources to oversee and enforce the compliance of financial reporting standards and process, hire skilled auditors, question company management, and communicate and coordinate with internal control staffs. Furthermore, Mande et al (2012) argue that large audit committee brings about relevant skills and experiences to effectively oversee the financial reporting process of firms, and also, the quality of corporate governance of firms increase with the number of audit committee members on board and they expect a positive relationship between audit committee size and financial leverage.

It is expected that the presence of audit committee members on board is positively related to the corporate governance quality and the debt ratio of the firms. I give a score 1 for the good corporate governance practice if the percentage of audit committee members on board equals to or greater than the median value of the percentage of audit committee members on board in my sample, 0 otherwise.

Audit Committee Independence

If the company has a full independent audit committee, the quality of audit committee of the company is deemed as optimal (Blue Ribbon Committee, 1999), as independent audit committees are not affected by external parties that may affect the independent view and reliability of financial accounting process, and therefore, a fully independent audit committee comprises of independent non-executive directors contribute to the effectiveness of the corporate governance of the companies as a whole. Moreover, Anderson et al (2004) find that the independence of audit committee and cost of debt are inversely related, suggesting that firms with fully independent audit committees that has better corporate governance can provide more transparent financial reporting and reduce the cost of debt, and therefore they can use more debt financing compared to firms with insider stacked audit committees. Furthermore, Mande et al (2012) suggest a strong positive association between audit committee independence and quality of corporate governance. It is expected that the independence of audit committee is positively associated with the corporate governance quality and the debt ratio of the firms, and hence, I give a score 1 for the good corporate governance practice if the audit committee is fully independent, 0 otherwise.

CEO Duality

As Jensen (1993) and Boyd (1994) point out, the greater the power and influence of CEO, the greater the conflict of interests between managers and shareholders. Also, Shleifer and Vishny (1986) state that CEO would become increasingly entrenched if he or she is also the chairman of the company, which leads to the ineffectiveness in overseeing the management compared to different people fulfilling the roles of chairman and CEO, and if the CEO is the Chairman of the company, the CEO may have greater influence on the company operation and board meeting agendas (Abbott et al, 2003).

It is expected that if different person fulfil the roles of chairman and CEO, the corporate governance quality of the firm would be considered as optimal, and hence, I give a score of 1 for the good corporate governance practice if the CEO is not the chairman on board, 0 otherwise, which indicates that there is an inverse relationship between corporate governance quality and CEO duality.

Corporate Governance Index

A number of previous studies look at the influence of corporate governance index on capital structure of firms. Jiraporn et al (2012) investigate the influence of aggregate corporate governance quality on capital structure, they suggest a robust and inverse association between capital structure and corporate governance quality, and the aggregate governance quality is measured by a corporate governance rating provided by Institutional Shareholder Services (ISS), which is based on a large sample of firms globally. Jiraporn et al (2012) provide a direct evidence that the aggregate corporate governance quality has a material influence on the corporate financing decisions such as capital structure choices, they argue that firms with

better corporate governance quality are likely to be less levered and firms with poorer corporate governance quality tend to be significantly more levered, which reflects that debt substitute for the corporate governance mechanisms in reducing the conflict of interests between corporate managers and external shareholders.

Similarly, based on the corporate governance data for a sample of international corporations from Investor Responsibility Research Center (IRRC) database, Jiraporn and Gleason (2007) test the empirical relation between capital structure and shareholder rights and find an inverse relationship between capital structure and shareholder rights, they suggest that firms adopt higher leverage when the shareholder rights are more constrained. Grounded on the conflict of interests between corporate managers and external shareholders due to the separation of ownership and control, their results imply that as the shareholder rights become more restricted, the conflict of interests between managers and shareholders are likely to be more severe as managers are better able to pursue their personal interests ahead of the interests of external shareholders. Therefore, in consistent with the agency theory, Jiraporn and Gleason (2007) report that by taking more debt, it helps to mitigate the conflict of interests when the shareholder rights are more restricted, and hence, when firms find that they have weak shareholder rights, debt is often increased to act as a monitoring and disciplinary mechanism to compensate for the weak shareholder rights and to monitor the management of the firms.

In addition, Jiraporn and Gleason (2007) point out that in addition to higher leverage, heavier regulation helps to substitute corporate debt to control for the conflict of interests between manager and shareholders in the sample of regulated firms. Specifically, they find that there is no association between debt ratio and shareholder rights in firms that operate in regulated

markets such as utilities, which implies that the necessity of using debt as a disciplinary mechanism to monitor and control the managerial behaviour is reduced in regulated firms compared to unregulated firms such as industrial firms. As previous studies report (Kole and Lehn, 1997; Booth et al, 2002), regulations may be already in place to help to reduce the conflict of interests between managers and shareholders when shareholder rights become restricted in regulated firms. Therefore, Jiraporn and Gleason (2007) argue that there is a trade-off between internal corporate governance mechanisms such as debt and external corporate governance mechanisms such as regulatory enforcement in solving the agency problems.

Moreover, Mande et al (2012) examine whether corporate financing choice between equity and debt is influenced by the corporate governance quality based on a sample of US firms, they find that the likelihood of equity issuance against debt issuance increases as governance quality increases. The reason is due to that the increase in corporate governance quality would help to reduce the agency costs as a result of the conflict of interests between managers and external shareholders, which leads to higher external financing. They argue while the agency costs are often associated with both of the equity issuance and debt issuance, however, the equity issuance is more likely to benefit from the reduction in agency costs as a results of the improved corporate governance quality in comparison to the debt issuance. Therefore, in order to reduce the agency costs of equity issuance, Mande et al (2012) suggest that firms should pay close attention to and improve their corporate governance quality before issuing equity, and firms should consider the benefits of accessing to the equity capital market against the costs of improving their corporate governance quality in the years before the equity issuance.

Furthermore, Florackis and Ozkan (2009) construct corporate governance index by utilizing one variable for the ownership structure named as substantial shareholdings and two variables for the corporate governance characteristics such as board size and fraction of non-executive directors on board. Nevertheless, the ownership structure and corporate governance characteristics are often measured separately in previous literatures (Brailsford et al 2002; Short et al, 2002; Belkhir, 2009; Fauzi and Locke, 2012; Bekiris, 2013) as they are different aspects of corporate governance mechanisms of firms, both of which would affect the capital structure of firms. Therefore, in this study, I separate the ownership structure and corporate governance characteristics rather than combine these two together, and I use a number of aspects of corporate governance characteristics to construct the corporate governance index.

In this study, the corporate governance index used is calculated as the sum of the above mentioned five corporate governance characteristics including board size, proportion of independent non-executive directors on board, proportion of audit committee members on board, independence of audit committee and CEO duality, each of the corporate governance characteristics equals to 1 or 0, and therefore, the corporate governance index equals to a number ranked from 0 to 5. I expected that the corporate governance quality have a positive or negative influence on capital structure. The positive influence indicates that good corporate governance quality increases the firm's ability to raise external capital. On the other hand, the negative influence indicates that the increase in corporate governance quality reduces the need of debt as a substitute in terms of alleviating the conflict of interests between managers and shareholders, and the increase in corporate governance quality would help to reduce the agency costs of the firm.

H_3: There is a positive or negative relationship between debt ratio and corporate governance index.

3.2.4 Capital Structure and Managerial Ownership

Jensen and Meckling (1976) find the managerial ownership is positively related to the debt ratio. As managerial ownership increases, managerial interests tend to be aligned with those of external shareholders, managers are less prone to pursue their personal interests to the detriments of external shareholders and tend to be more responsible for their decisions, which would limit the agency costs of debt and increase the use of debt for the companies. On the other hand, Firth (1995) argues that there is a negative relationship between managerial ownership and capital structure. He claims that the increases in the shareholding of managers would make the managers act more conservatively because of the increased bankruptcy risks associated with the increased levels of debt.

Previous studies find an inverted U-shaped relationship between debt ratio and managerial shareholding (Brailsford et al, 2002; Ozkan and Ozkan, 2004), they argue that at the lower levels of managerial ownership, the increase in managerial ownership leads to an incentive alignment effect that managerial interests of wealth maximization are more closely related to those of external shareholders. However, at the high levels of managerial ownership, the increase in managerial ownership results in a managerial entrenchment effect that managers become more entrenched in the board of the companies and managers can be more optimistic or risk averse and the monitoring powers of external shareholders are significantly reduced because of the entrenched managers. Nonetheless, Florackis and Ozkan (2009) argue inverted U-shaped relationship only exists in firms with weak corporate governance.

H_4: There is a positive, negative or an inverted U-shaped relationship between debt ratio and managerial ownership.

3.2.5 Capital Structure and Substantial Shareholdings

The relationship between debt ratio and institutional shareholding is also examined in previous studies. Brailsford et al (2002) and Florackis and Ozkan (2009) find a positive relationship between debt ratio and institutional shareholding, they argue as institutional shareholding increases, institutional shareholders often play monitoring roles in limit the managerial behaviours to serve their own interests and a better corporate governance structure within the firms, which would reduce the agency costs of debt and lead to higher debt financing. Also, they claim that the presence of institutional shareholders in the firm transfers a good signal to the outside investors, through which the firms can gain easier and cheaper access to the capital markets.

On the other hand, Short et al (2002) find a negative relationship between debt ratio and substantial shareholdings from institutional investors. They argue that both debt borrowing and institutional shareholding can act as the monitoring mechanism to limit the managers serving their own interests, and therefore, the presence of both external debt and institutional shareholders mitigate the need of each other as a monitoring mechanism, which leads to a negative relationship between debt ratio and institutional shareholding.

Recent evidences found that the institutional shareholders in the UK do not perform their monitoring function. Goergen et al (2008) report that the information asymmetry between managers and outside investors is not reduced as institutional shareholding increases, and the

share price reactions are insignificant because of the increase in institutional shareholding and the reactions of share prices are not different from those companies without increases in institutional shareholding. In addition, Florackis and Ozkan (2009) argue that most institutional shareholders in the UK are financial institutions and do not perform active monitoring. As Mallin (2005) points out, the UK institutional investors own approximately 80 percent of the UK equity shares, the largest institutional investors are insurance companies holding 17 percent, pension fund holding 16 percent, unit trusts, investment trusts and financial institutions holding 15 percent and overseas shareholders holding 32 percent.

Mallin (2001) points out that institutional investors are expected to engage in regular conversations with management and vote at annual general meetings to the favour of other shareholders and ensure the appropriate corporate governance structure in place, and however, they announce that there is much lower level of voting than expected in annual general meeting by the institutional investors in the UK and UK institutional investors does not actively engage in monitoring to improve the corporate governance of firms. Moreover, Mallin (2008) reports that the institutional investors are mainly pension funds, insurance companies and mutual funds, and as the growth in pension plans and institutional investments, the institutional shareholders are likely to become more powerful and tend to play a more and more important role in sustain good governance and increase the value of the shareholders over the long-term. Further on, Mallin (2012) argues the institutional investors are increasingly expected to work with the investee companies and to help ensure the investee companies have satisfactory level of corporate governance structure in place, the form of the engagement between institutional investors and investee companies includes dialogue with management and voting systems. Mallin (2012) claims that as the development of proxy

voting, the institutional investors have increasingly more power to ensure the investee companies operate according to the best possible corporate governance practices, including appointment of board of directors and board composition, remuneration packages and strategic issues that may have great influence on shareholder rights and shareholder interests. However, Mallin (2012) also discusses about the barriers to improve corporate governance structure of investee companies in the UK, such as timeliness and efficiency of particular voting systems as well as cross border voting.

H_5: There is a positive or negative relationship between debt ratio and substantial shareholdings.

3.2.6 Effect of Managerial Ownership on Capital Structure and Substantial Shareholdings

Brailsford et al (2002) claim the positive relationship between debt ratio and substantial shareholding is weakened with increases in managerial ownership. As managers become more entrenched at higher level of managerial ownership at the companies, their interests tend to deviate from the interests of outside investors and they are more likely to avoid the monitoring from external shareholders, which reduces the effects of substantial shareholding on debt ratio. As Brailsford et al (2002, p.15) and Hermalin and Weisbach (1991) state, managers tend to be entrenched if all together they hold 20% or more of shares. I include a dummy variable that equals to 1 if managers hold 20% or more of shares, 0 otherwise.

H_6: The relationship between debt ratio and substantial shareholdings is weakened by managerial ownership.

3.2.7 Effect of Substantial Shareholdings on Capital Structure and Managerial Ownership

Empirical literatures find the negative relationship between debt ratio and managerial ownership is weakened by institutional shareholding. Firth (1995) reports as managers invest a substantial wealth in the companies, they become more conservative and are less likely to engage in risky activities and take more debt to finance their investment because of the negative effects at higher levels of debt ratio. However, the external institutional shareholders do not necessarily want to pursue low levels of debt ratio as managers, but they consider more about the profitability of the companies. Therefore, increases in institutional shareholdings effectively reduce the managerial incentive to pursue the low levels of debt. Florackis and Ozkan (2009) find the inverted U-shaped relationship between the managerial ownership and the debt ratio is weakened with the presence of institutional investors. For instance, Shleifer and Vishny (1986) report the substantial shareholders are deemed as the safeguard for small investors as their interests tend to align together. Friend and Lang (2008) report if there is a presence of substantial shareholdings with 10% or more of equity shares, the substantial shareholding is deemed to be significant. I include a dummy variable that equals to 1 if one or more of substantial shareholders at the firm hold 10% or more of equity shares, otherwise the dummy variable equals to 0.

H_7: The relationship between debt ratio and managerial ownership is weakened by substantial shareholdings.

3.3 Data and Methodology

3.3.1 Data and Variable

The sample consists of all the public limited companies in the main market of London Stock Exchange in the UK over the period of 2005 to 2011. The financial data are collected from DataStream, and due to the limited availability of the historical rating data, the credit rating data used are the S&P's historical credit ratings collected from DataStream. Following the previous capital structure literatures, firms from financial and utility industries are excluded from the sample, because those firms have different financial and ownership structure compared to other industrial firms. Furthermore, firms with any missing observation for any variable used in the model are excluded from the original sample.

Table 3.1 below defines the variables used in this study. I utilize two different debt ratios as dependent variables, which are the total debt ratio and long-term debt ratio. As argued by Mittoo and Zhang (2010), the long-term credit rating of firms will more likely to influence the long-term debt ratio rather than total debt ratio, and therefore, I include the long-term debt ratio as one of the dependent variables used in the analysis. Nevertheless, the UK firms obtain most of their debt from banks rather than public investors, as short-term loans are more flexible in terms of debt renegotiation compared to long-term public debts, and also, banks do not give too much long-term loans to the borrowers including firms, and therefore, the value of long-term debt ratio is likely to be lower compared to total debt ratio, and hence, using long-term debt ratio as dependent variable will likely to generate downward bias for the coefficient estimates for the rating variables such as ACCESS and RATING in comparison to the total debt ratio. Therefore, to take this possible downward bias into consideration, I run two sets of tests, one uses total debt ratio and the other one uses long-term debt ratio as

dependent variable.

For the rating variables, I distinguish between firms having credit rating and firms not having credit rating, and also between investment grade rating and speculative grade rating. For the consideration of offsetting effects between investment grade rating and speculative grade rating on debt ratio, I include two other variables that are ACCI and ACCS, which effectively separate between investment grade rating and speculative grade rating. For example, the effect of investment grade rating on debt ratio may be opposite to the effect of speculative grade rating, and firms with credit rating include firms with both investment grade ratings and speculative grade ratings, as the effect of investment grade ratings on debt ratio and effect of speculative grade ratings on debt ratio may offset each other because of the opposite effects, the effect of credit rating on debt ratio may not be significant because credit rating includes both investment grade rating and speculative grade rating. Therefore, not only I separate between the firms having credit rating and firms not having credit rating, but also I use firms having investment grade rating and use firms not having credit rating as a comparison group, and I use firms having speculative grade rating and use firms not having credit rating as a comparison group.

As discussed in the previous chapter, I excluded the outliers as the outliers are extreme values and should not be included in the sample. In addition, in order to control for the industry-specific effects and time-specific effects, I incorporate the industry dummies and time dummies in all specifications, except in the GMM specification the industry dummies are dropped from the model. Table 3.1 describes the variables that are used in the analysis.

Table 3.1
Variable Definitions

Variable	Definitions	Source
Dependent Variable		
DEBTA	(Total Debt / Total Assets) represents book value of total debt to book value of total assets	DataStream
LDEBTA	(Long-Term Debt / Total Assets) represents book value of long-term debt to book value of total assets	DataStream
Independent Variables		
Credit Rating		
ACS	Equals to 1 if firm has a credit rating, 0 if firm does not have a credit rating	DataStream
ACCI	Equals to 1 if firm has an investment grade rating (i.e., AAA+ to BBB-), 0 if firm does not have a credit rating	DataStream
ACCS	Equals to 1 if firm has a speculative grade rating (i.e., BB+ to C), 0 if firm does not have a credit rating	DataStream
RATING	Equals to 1 if firm has an investment grade rating (i.e., AAA+ to BBB-), 0 if firm has a speculative grade rating (i.e., BB+ to C)	DataStream
Ownership Structure		
MOW	Percentage of shares held by both executive directors and non-executive directors (%)	Annual Report
MOWSQ	Square of MOW	
EXT	Percentage of shares held by substantial shareholders owning 3% or more of shares (%)	Annual Report
DM	Dummy variable equals to 1 to indicate managerial ownership with 10% or more of shares, 0 otherwise	Annual Report
DEXT	Dummy variable equals to 1 to indicate presence of substantial shareholder with 10% or more of shares, 0 otherwise	Annual Report
Corporate Governance Characteristics		
BOD	Sum of directors on board	Annual Report
BODD	1 if board size equals to or less than median value of board size, 0 otherwise	Annual Report
IND	Percentage of sum of independent non-executive directors divided by sum of directors on board	Annual Report
INDD	1 if percentage of independent non-executive directors on board equals to or greater than median value of percentage of independent non-executive directors on board, 0 otherwise	Annual Report
AUD	Percentage of sum of audit committee members divided by sum of directors on board	Annual Report
AUDD	1 if percentage of audit committee members on board equals to or greater than median value of percentage of audit committee members on board, 0 otherwise	Annual Report
AIN	1 if audit committee is independent, 0 otherwise	Annual Report
CEO	1 if CEO is not chairman on board, 0 otherwise	Annual Report
GOV	Sum of corporate governance characteristics dummy variables, including BODD, INDD, AUDD, AIN, CEO	Annual Report
Control Variables		
SIZE	Logarithm of total sales	DataStream
ROA	Operating income to book value of total assets	DataStream
TANG	Net property, plant and equipment to book value of total assets	DataStream
RD	Research and development expense to total sales	DataStream
HDT	Book value of total debt to book value of total assets minus its two to five years historical average value as a measure of target capital structure	DataStream
IDT	Book value of total debt to book value of total assets minus its industry	DataStream

	average value as a measure of target capital structure	
RI	Continuous stock return Log (RI_t / RI_{t-1}), RI represents total return index	DataStream
IMB	Book value of total assets minus book value of equity plus market value of equity to book value of total assets minus its industry average value	DataStream
QCK	Current assets minus inventories to current liabilities	DataStream
INTST	Earnings before interest and tax to interest expense	DataStream
INDUSTRY	Industry dummy in order to control for industry effects	DataStream
TIME	Time dummy in order to control for time effects	DataStream

3.3.2 Control Variables

I include a set of firm characteristics as control variables, in order to control for the effects of other capital structure determinants on the debt ratio. In this section, I explain the expected relationships between capital structure and these control variables.

Firm Size

Firm size is defined as logarithm of total assets. Rajan and Zingales (1995) argue that firm size is an inverse proxy of probability of default that large firms are more capable to take on additional debt compared to small firms, and hence, they expect that large firms tend to be more levered than small firms. On the other hand, Titman and Wessels (1988) provide an alternative point of view that firm size is a proxy of cost of raising new capital, they argue that it is more costly for small firms to issue informational sensitive securities such as equity and long-term debt compared to large firms, because small firms have higher levels of information asymmetry, thus, the small firms tend to issue short-term debts to finance their investments because the fixed costs to borrow short-term debts are lower, and the small firms tend to be more levered than large firms. In this study, I expect that firm size can be either positively or negatively related to capital structure.

Profitability

Profitability is defined as operating income to book value of total assets. As pecking order

theory suggests, the firms tend to finance themselves first with retained earnings, second with debt and third with equity, due to the information costs of external financing. Profitable firms often have more discretion in choosing the type of external financing, and debt is often cheaper than equity in terms of the information costs. Therefore, I expect that profitability is negatively associated with capital structure of firms (Titman and Wessels, 1988; Rajan and Zingales, 1995; Fama and French, 2002).

Asset Tangibility

Asset tangibility is defined as net property, plant and equipment to book value of total assets. As Rajan and Zingales (1995) suggest, firms with more tangible assets that can be used as collateralization, such as property, plant and equipment, are more likely to issue debt as opposed to equity. On the other hand, Titman and Wessels (1988) contend that the agency costs are higher in firms with less collateralizations, and it becomes more difficult to monitor the managerial consumption as it is difficult to monitor the capital outlays in such firms. Thus, firms with less collaterals tend to choose higher debt levels to prevent the managerial consumption of perquisite. Therefore, I expect that asset tangibility is either positively or negatively related to capital structure.

Research and Development

Research and development expenditure is defined as research and development expense to total sales, as a proxy for growth opportunities. Growth opportunities are the intangible assets that may add value to the firm in the near future. Prior literatures point out a negative relationship between capital structure and growth opportunities. Titman and Wessels (1988) report that growth opportunities cannot be used as collateralization to issue secured debt, and

it is negatively related to financial leverage. Also, Gatchev et al (2009) and Morellec and Schurhoff (2011) suggest that firms tend to issue equity to finance their growth opportunities. Besides, Hovakimian et al (2001) suggest that firms with high growth opportunities prefer to finance themselves with retained earnings rather than debt. Moreover, due to the problem of underinvestment, firms with high growth opportunities tend to reduce their debt levels as firms with high levels of debt would pass up valuable investment opportunities (Rajan and Zingales, 1995; Hovakimian et al, 2001; Fama and French, 2002).

In contrast, a positive relationship between capital structure and growth opportunities has also been documented in prior studies. For example, firms use debt as a disciplinary mechanism to limit the managerial discretion in firms with high growth opportunities, such as problem of overinvestment (Chen, 2004; Gaud et al, 2005). Managers may invest in too many projects that do not act at the best interest of shareholders, especially when managers benefit from the arrangements of project and shareholders do not. Furthermore, Lang et al (2006) argue that firms with high growth opportunities obtain debt more easily as creditors recognize growth opportunities. Therefore, it is expected that research and development expenditure is either positively or negatively related to capital structure.

Target Leverage

The trade-off theory of capital structure suggests that firms tend to trade-off between the costs and benefits of external debt, and firms maximise firm value through choosing a target level of capital structure. This study take the effect of deviation from the target capital structure on the actual debt ratio into consideration, as firms may choose to issue debt or equity depending on the deviation from the target capital structure in order to reduce the costs of debt financing

and increase the benefits of taking additional debt. As firms may have different target leverage, I utilize two measures of target leverage, which are the historical average debt ratio and industry average debt ratio. The historical average debt ratio is defined as the two to five years historical average debt ratio depending on the data availability (Marsh, 1982; Shyam-Sunder and Myers, 1999; Hovakimian et al, 2001; Hovakimian and Li, 2008; Hovakimian et al, 2009; Lyandres, 2010). The industry average debt ratio is defined as the average value of debt ratio across different industries included in this study (Hovakimian et al, 2001; Hovakimian and Li, 2008; Lyandres, 2010).

The deviation from the target leverage is calculated as the actual debt ratio minus historical or industry average debt ratio, and it is expected that there is a positive relationship between debt ratio and deviation from the target debt ratio, and also, it is expected that the leverage difference between the over-levered firms and under-levered firms tend to get smaller in the following year, reflecting that firms adjust their capital structure back to the target levels.

Stock Return

Stock return is defined as continuous stock return. Graham and Harvey (2002) report that over 60% of CFOs report recent stock price appreciation is an important consideration for the companies while issuing equity. Also, Hovakimian et al (2004) and De Bie and De Haan (2007) suggest that firms issue equity after periods of high stock returns, which will likely to increase equity value as well as total assets as it equals to total liabilities plus owners' equity, and hence an increase in stock return will likely to decrease debt to total assets ratio. Furthermore, Kayham and Titman (2007) state that the changes in stock price influence the firms' capital structure significantly and tend to drive their capital structure away from target

levels.

On the other hand, Fama and French (1993) and Carhart (1997) suggest multi-factor asset pricing models to capture the average returns of stock associated with firm size and book to market ratio, and they find small firms and firms with high book to market ratio outperform large firms and firms with low book to market ratio, and hence, stock return and total assets are likely to be inversely related given the inverse relationship between stock market return and firm size, which is likely to lead to a positive relationship between stock return and debt ratio. Therefore, it is expected that the stock return is either positively or negatively related to debt ratio.

Industry-adjusted MTBV

Industry-adjusted market to book ratio is defined as book value of total assets minus book value of equity plus market value of equity to book value of total assets minus its industry average value. The market to book ratio has been used as a proxy of market valuation of the firm. Rajan and Zingales (1995) find that the market to book ratio is negatively related to the capital structure in the G-7 countries, they suggest that firms time the equity market by issuing equity when the managers consider the equity is overvalued and repurchasing equity when it is undervalued. Similarly, Baker and Wurgler (2002, p.3) find that "capital structure is the cumulative outcome of attempts to time the equity market", they find a negative relationship between the market to book ratio and capital structure. They argue that the equity market timing effect is quite large and persistent over a long period, which is inconsistent with the trade-off theory that firm has target leverage. Furthermore, Mahajan and Tartaroglu (2008) find that the market to book ratio is negatively associated with the financial leverage in the

G-7 countries. Nevertheless, they find that this negative relationship cannot be explained by the equity market timing behaviour of the firms, and they argue that firms fully rebalance their capital structure to target level shortly after the equity issues. Therefore, it is expected that industry-adjusted market to book ratio is negatively related to capital structure.

Liquidity

Quick ratio is defined as current assets subtracted by inventories to current liabilities. Quick ratio is a measure of liquidity and firm's ability to cover its short-term loan and current portion of long-term debt using liquid assets. Firms that are lack of liquidity and under financial distress tend to issue equity as opposite to debt, which is suggested by the pecking order theory. Therefore, it is expected the quick ratio is positively related to capital structure.

Interest Coverage

Interest coverage ratio is defined as earnings before interest and tax to interest expense. The interest coverage ratio indicates the firm's ability to cover its debt interests using operating income. A higher interest coverage ratio shows a greater level of financial flexibility to pay back the debt interest. Therefore, it is expected that interest coverage ratio is positively related to debt ratio.

3.3.3 Summary Statistics

Table 3.2 shows the distribution of the sample in each year from 2005 to 2011 by rated firms and unrated firms and by investment grade firms and speculative grade firms. In the table, I find that the number of rated firms increases gradually during the sample period from 2005 to 2011, which is consistent with the results reported by Hovakimian et al (2009), as the number

of firms using credit ratings increases in recent years. I use long-term debt rating as the proxy for the bond market access (Faulkender and Petersen, 2006; Mittoo and Zhang, 2010). Similar to 19% as reported by Faulkender and Petersen (2006), 15% as reported by Mittoo and Zhang (2010) and Judge and Korzhenitskaya (2011), I find about 17% of firm year observations from 2005 to 2011 in the sample have long-term debt credit ratings, which shows that long-term debt is not a major source of external financing, as suggested in the studies of Faulkender and Petersen (2006) and Mittoo and Zhang (2010).

Nevertheless, Hovakimian et al (2009) report in 2004, 85.4% of the largest 500 firms in the US have credit ratings. However, in contrast with the US firms, a relatively small number of the largest UK public firms have credit ratings, which is only 17% during the sample period, which supports the anecdotal evidence that the UK firms prefer finance themselves with short-term bank loans to long-term public debts, as the bankruptcy law of UK is stricter than US in terms of the creditor protection that may limit the firms to use long-term debt financing. Denis and Mihov (2003) argue that short-term bank loans are more flexible in terms of debt renegotiation to banks and private lenders than long-term public debts.

Initially there are 350 rated firms, 2177 unrated firms and totally 2527 firms in the sample from 2005 to 2011, and within the 350 rated firms, there are 285 investment grade firms and 65 speculative grade firms. Nevertheless, having excluded the missing variables for all the variables included in the dataset, the number of the observations has been reduced, there are 176 rated firms, 890 unrated firms and 1066 firms in total, and there are 145 investment grade firms and speculative grade firms within 176 rated firms.

Table 3.2
Sample Distribution

Year	Rated Firms	Unrated Firms	Total Firms
2005	15	97	112
2006	18	112	130
2007	21	123	144
2008	25	146	171
2009	31	153	184
2010	34	141	175
2011	32	118	150
Total	176	890	1,066
Year	Investment Grade Firms	Speculative Grade Firms	Rated Firms
2005	14	1	15
2006	16	2	18
2007	18	3	21
2008	22	3	25
2009	26	5	31
2010	25	9	34
2011	24	8	32
Total	145	31	176

According to S&P's credit rating scales, I divide the total firms having credit ratings into investment grade firms if their ratings are BBB- or above and speculative grade firms if their ratings are BB+ or below. I find that in the sample of all rated firms, approximately 82% of rated firms have investment grade ratings and 18% of rated firms have speculative grade ratings, compared to 82% of rated firms have investment grade ratings and 28% of rated firms have speculative grade ratings in Canada as reported by Mittoo and Zhang (2010). As firms in the sample are the constituents of FTSE All Share index and these firms are among the largest UK public firms with highest market capitalisations, which is consistent with the previous literatures suggesting that larger firms often have cheaper and better access to long-term public debt market (Faulkender and Peterson, 2009; Leary, 2009).

Table 3.3
Summary Statistics

Summary Statistics for Rated Firm and Unrated Firm								
	Rated Firms = 176 Obs.				Unrated Firms = 890 Obs.			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
DEBTA	0.29	0.15	0.00	0.62	0.21	0.12	0.00	0.63
LDEBTA	0.24	0.15	0.00	0.60	0.17	0.12	0.00	0.58
MOW	0.03	0.10	0.00	0.55	0.05	0.10	0.00	0.65
EXT	0.30	0.17	0.00	0.94	0.40	0.31	0.00	8.06
BOD	10.82	2.65	4.00	18.00	8.04	2.13	4.00	19.00
IND	0.59	0.14	0.00	0.93	0.53	0.13	0.00	0.88
AUD	0.39	0.11	0.14	0.75	0.43	0.11	0.00	0.83
AIN	0.91	0.29	0.00	1.00	0.90	0.30	0.00	1.00
CEO	0.99	0.08	0.00	1.00	0.98	0.13	0.00	1.00
GOV	3.19	0.86	1.00	5.00	3.67	1.03	0.00	5.00
SIZE	6.80	0.65	5.32	8.40	5.84	0.55	3.88	7.59
ROA	0.06	0.05	-0.06	0.26	0.05	0.06	-0.26	0.42
TANG	0.36	0.27	0.00	0.95	0.26	0.21	0.00	0.94
RD	0.01	0.02	0.00	0.15	0.01	0.03	0.00	0.41
HDT	-0.00	0.07	-0.28	0.24	0.00	0.07	-0.34	0.24
IDT	0.08	0.13	-0.20	0.37	0.01	0.12	-0.29	0.42
RI	0.04	0.19	-0.88	0.68	0.02	0.23	-1.14	1.13
IMB	0.19	1.12	-1.69	3.06	-0.15	1.00	-2.25	3.12
QCK	0.78	0.38	0.17	2.16	0.85	0.39	0.03	2.27
INTST	9.14	9.97	-9.30	45.75	9.27	10.03	-18.67	47.01
Summary Statistics for Investment Grade Firm and Speculative Grade Firm								
	Investment Grade Firms = 145 Obs.				Speculative Grade Firms = 31 Obs.			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
DEBTA	0.27	0.13	0.00	0.58	0.39	0.18	0.09	0.62
LDEBTA	0.23	0.13	0.00	0.57	0.29	0.20	0.00	0.60
MOW	0.01	0.04	0.00	0.25	0.11	0.22	0.00	0.55
EXT	0.29	0.17	0.00	0.94	0.34	0.17	0.00	0.60
BOD	11.39	2.50	4.00	18.00	8.16	1.49	6.00	12.00
IND	0.61	0.15	0.00	0.93	0.54	0.09	0.38	0.71
AUD	0.38	0.11	0.14	0.75	0.42	0.07	0.30	0.50
AIN	0.89	0.31	0.00	1.00	1.00	0.00	1.00	1.00
CEO	0.99	0.08	0.00	1.00	1.00	0.00	1.00	1.00
GOV	3.08	0.82	1.00	5.00	3.71	0.86	2.00	5.00
SIZE	6.91	0.63	5.34	8.40	6.27	0.41	5.31	7.26
ROA	0.07	0.05	-0.06	0.26	0.05	0.04	-0.00	0.14
TANG	0.33	0.25	0.02	0.95	0.53	0.29	0.00	0.95
RD	0.01	0.03	0.00	0.15	0.00	0.00	0.00	0.02
HDT	0.00	0.06	-0.28	0.24	-0.03	0.09	-0.23	0.12
IDT	0.07	0.12	-0.20	0.27	0.15	0.15	-0.09	0.37
RI	0.04	0.14	-0.48	0.47	0.05	0.33	-0.88	0.68
IMB	0.31	1.10	-1.65	3.06	-0.38	1.03	-1.69	2.57
QCK	0.76	0.32	0.24	1.90	0.89	0.57	0.17	2.16
INTST	10.19	10.51	-9.30	45.75	4.19	4.34	-2.91	17.11

Table 3.3 presents the summary statistics for the variables for sample period of 2005 to 2011. In comparison of the average total debt ratio between rated firms and unrated firms, rated firms have 8 percentage points more total debt ratio on their capital structure compared to

unrated firms. In terms of the average long-term debt ratio between rated firms and unrated firms, rated firms have 7 percentage points more long-term debt ratio than non-rated firms. The results are consistent with the statistics reported by Faulkender and Petersen (2006) and Mittoo and Zhang (2010), Faulkender and Petersen (2006) point out that rated firms with bond market access are more levered than firms without access, because rated firms with bond market access tend to issue more long-term debt than unrated firms, as long-term debt offers a cheaper source of capital compared to short-term debt.

In addition, firms with speculative grade ratings have 12 percentage points more average total debt ratio than firms with investment grade ratings, and also, firms with speculative grade rating have 6 percentage points more average long-term debt ratio than firms with investment grade ratings. The results are consistent with the previous studies that firms with speculative grade rating prefer speculative grade bond to short-term loans in order to maintain their financial position for their future investment needs, as long-term public debts have lower cost of borrowing, larger size of issue, longer maturity, less restrictive covenants and require less secured assets compared to short-term bank loans (Rajan and Winton, 1995; Gilson and Warner, 1997; Faulkender and Petersen, 2005). On the other hand, investment grade firms tend to have less leverage on their capital structure than speculative grade firms, because investment grade firms tend to have target minimum level of credit rating because their debt contracts are often conditional upon minimum level of rating, such as commercial paper and Eurobond (Kisgen, 2009; Kisgen, 2012).

In terms of the average values of firm characteristics, rated firms tend to be larger, more profitable, and have more tangible assets than unrated firms, and also, investment grade firms

are larger, more profitable, and have more growth opportunities and higher interest coverage ratio than speculative grade firms.

3.3.4 Model Specification

3.3.4.1 Effects of Credit Rating and Corporate Governance on Capital Structure

Equation 3.1.1 and equation 3.1.2 describe the models used in the analysis of the effects of credit rating and corporate governance on capital structure of firms. Firms with credit ratings tend to have different characteristics compared to firms without credit ratings. Faulkender and Petersen (2005) point out that firms have access to the bond market as measured by having credit ratings, are larger in size, have more tangible assets, longer business cycle and less research and development costs. Moreover, Arikawa (2008) find that firms with bond market access have more growth opportunities and less default risks. Further on, Denis and Mihov (2003) argue that long-term debt issuers are larger, more profitable, have more tangible assets and less research and development costs than the issuers of short-term bank loans. Bond market access is also determined by the firms' desirability to borrow long-term debt as firms may choose to finance themselves with only equity and short-term bank loan, for example, the UK firms may choose to borrow short-term bank loans to finance their projects as short-term loans are more flexible in terms of the debt renegotiation than long-term debts (Denis and Mihov, 2003).

$$
\begin{aligned}
DEBTA_{i,t} &= \beta_0 + \beta_1 ACS_{i,t-1} + \beta_2 MOW_{i,t-1} + \beta_3 MOWSQ_{i,t-1} + \beta_4 EXT_{i,t-1} \\
&+ \beta_5 DI + \beta_6 (DI * MOW)_{i,t-1} + \beta_7 (DI * MOWSQ)_{i,t-1} + \beta_8 DML/S \\
&+ \beta_9 (DML/S * ISH)_{i,t-1} + \beta_{10} GOV_{i,t-1} + \beta_{11} SIZE_{i,t-1} + \beta_{12} ROA_{i,t-1} \\
&+ \beta_{13} TANG_{i,t-1} + \beta_{14} RD_{i,t-1} + \beta_{15} HDT_{i,t-1} + \beta_{16} IDT_{i,t-1} + \beta_{17} RI_{i,t-1} \\
&+ \beta_{18} IMB_{i,t-1} + \beta_{19} QCK_{i,t-1} + \beta_{20} INTST_{i,t-1} + \beta_{21} INDUSTRY_{i,t-1} \\
&+ \beta_{22} TIME_{i,t-1} + \varepsilon_{i,t}
\end{aligned}
\tag{3.1.1}
$$

$$
\begin{aligned}
DEBTA_{i,t} &= \beta_0 + \beta_1 ACS_{i,t-1} + \beta_2 MOW_{i,t-1} + \beta_3 MOWSQ_{i,t-1} + \beta_4 EXT_{i,t-1} \\
&+ \beta_5 DI + \beta_6 (DI * MOW)_{i,t-1} + \beta_7 (DI * MOWSQ)_{i,t-1} + \beta_8 DML/S \\
&+ \beta_9 (DML/S * ISH)_{i,t-1} + \beta_{10} BOD_{i,t-1} + \beta_{11} IND_{i,t-1} + \beta_{12} AUD_{i,t-1} \\
&+ \beta_{13} AIN_{i,t-1} + \beta_{14} CEO_{i,t-1} + \beta_{15} SIZE_{i,t-1} + \beta_{16} ROA_{i,t-1} + \beta_{17} TANG_{i,t-1} \\
&+ \beta_{18} RD_{i,t-1} + \beta_{19} HDT_{i,t-1} + \beta_{20} IDT_{i,t-1} + \beta_{21} RI_{i,t-1} + \beta_{22} IMB_{i,t-1} \\
&+ \beta_{23} QCK_{i,t-1} + \beta_{24} INTST_{i,t-1} + \beta_{25} INDUSTRY_{i,t-1} + \beta_{26} TIME_{i,t-1} + \varepsilon_{i,t}
\end{aligned}
\tag{3.1.2}
$$

As stated in the first hypothesis, in order to test whether the bond market access has a positive influence on the capital structure of firms, the equation (1) is set as below. As pointed out by Faulkender and Petersen (2005) and Mitto and Zhang (2010), firms with bond market access tend to be significantly more levered than firms without access, because of the easier and cheaper access to the bond market that has lower cost of borrowing, larger size of issue and longer maturity.

With regards to the corporate governance variables, I include the proxies for the corporate governance characteristics, managerial ownership and substantial shareholdings in the models together with the credit rating variable. In addition, as suggested by Brailsford et al (2002), Ozkan and Ozkan (2004) and Florackis and Ozkan (2009), the variable MOWSQ is used to represent the high level of managerial ownership. Brailsford et al (2002) and Florackis and Ozkan (2009) report that at low level of managerial ownership, the corporate managers tend

to reduce their consumption of perquisite and the incentives of managers are better aligned with those of external shareholders, leading to reduced agency costs of debt and increased debt ratio, and however, at high level of managerial ownership, the risk-averse managers are expected to reduce the debt level in order to reduce the bankruptcy risk and cost of debt, and also the managers may want to decrease the discipline of debt as a monitoring tool, leading to decreased debt ratio. Therefore, if there is an inverted U-shaped relationship between debt ratio and managerial ownership, the coefficient of MOW is expected to be positive and the coefficient of MOWSQ is expected to be negative.

In order to test for the influence of high level of managerial ownership on the relationship between debt ratio and substantial shareholdings, I add dummy variable DML that equals to 1 when the level of managerial share ownership is 20% or more of shares, otherwise DM equals to 0. In addition, I add another dummy variable DMS that equals to 1 when the level of managerial ownership is 10% or more of shares, otherwise it equals to 0. The coefficient on EXT explain the relationship between debt ratio and substantial shareholdings when there is no presence of high level of managerial ownership, whereas the coefficient on DML/S*EXT explain the difference in the relationship between debt ratio and substantial shareholdings when there is no presence of high level of managerial ownership and when there is presence of high level of managerial ownership.

In order to examine the impact of the presence of substantial shareholdings on the relationship between debt ratio and managerial ownership, I add dummy variable DI that equals to 1 when there is the presence of high level of substantial shareholdings with 10% or more of shares, otherwise DI equals to 0. The coefficient on MOW explains the relationship between debt

ratio and managerial ownership when there is no presence of high level of substantial shareholdings, and the coefficient on DI*MOW explains the difference in the relationship between debt ratio and managerial ownership when there is no presence of high level of substantial shareholdings and when there is presence of high level of substantial shareholdings.

I conduct the panel regression analysis with robust standard errors to test for the effects of credit rating and corporate governance on capital structure. In order to choose whether to use consistent fixed effects estimator and efficient random effects estimator in panel regressions, I conduct Hausman test for each of the panel regression and report p-values in the result section. As the null hypothesis for Hausman test is that the coefficients estimated using consistent fixed effects estimator are the same as the coefficients estimated using efficient random effects estimator, and therefore, if the p-value of Hausman test is insignificant, then the test suggests to use random effects, however, if the p-value of Hausman test is significant, then the test suggests to use fixed effects for the panel regression.

3.3.4.2 Effects Prior and During the Financial Crisis

Due to more stringent lending requirements of financial institutions, it becomes more difficult for the firms to borrow short-term loans from banks, and therefore, the credit rating concerns of managers on the bond market will play a more important role during the financial crisis. Also, Michelsen and Klein (2011) point out that as a result from the limited short-term bank loans during the financial crisis, bond market plays a more important role in managerial financing choices than short-term debt market.

I expect that the positive relationship between capital structure and credit rating to become stronger during the financial crisis, because firms with credit ratings are able to obtain their debt financing from the bond market and maintain their financial leverage successfully, while firms without ratings may become less levered, as banks are unwilling to lend to borrowers that leads to a reduced supply of short-term bank loans.

Moreover, I expect the positive or negative relationship between capital structure and corporate governance quality to be economically more significant during the financial crisis. The positive relationship between capital structure and corporate governance quality shows that firms with better corporate governance quality have easier and cheaper access to the external capital markets due to the reduction in agency costs of external financing, and firms with lower corporate governance quality tend to have more expensive access to the external capital markets due to the increased agency costs. As the pecking order theory suggests that firms prefer debt to equity, I would expect that firms with better corporate governance quality are likely to become more levered than firms with lower corporate governance quality. As the more stringent lending environment during the financial crisis, the leverage difference between stronger-governed firms and weaker-governed firms tend to be greater than the period before the financial crisis, which is mainly driven by the weaker-governed firms that these firms are likely to become financially constrained as they may find even more expensive to raise funding externally.

On the other hand, the expected inverse relationship between capital structure and corporate governance quality implies that external debt and corporate governance act as substitutes of each other in controlling the managerial consumption of perquisite and protecting the interests

of external shareholders, which help to alleviate the conflict of interests between managers and shareholders as well as agency costs. During the financial crisis, I would predict that the negative association between capital structure and corporate governance quality tends to be stronger, firms with good corporate governance have monitoring and controlling mechanisms in place, and they are likely to further decrease the use of debt as the costs of debt financing become increasingly higher. On the contrary, firms with weak corporate governance may need additional debt to reduce the free cash flows available to managers and limit the managerial consumption in order to protect the interests of external shareholders and reduce the agency costs, as it become more risky for the managers to engage in the value decreasing activities during the financial crisis.

Therefore, in order to take into consideration the possible different effects of credit rating and corporate governance on capital structure for the periods before and during the financial crisis in 2008, I divide the entire sample period into two sample periods, which are between 2005 and 2007 and between 2008 and 2011 respectively.

3.3.4.3 Effects of Credit Quality and Corporate Governance on Capital Structure

Equation 3.2.1 and equation 3.2.2 describe the models used in the analysis of the effects of credit quality and corporate governance on capital structure of firms. Endogeneity is an important concern in this study. Although one of the main focuses of this study is to examine the impact of credit quality on capital structure, and however, as stated on S&P's credit rating criteria, capital structure is one of the most important criteria in determining the credit rating levels of firms. Capital structure of firms affect their credit rating levels and their credit rating

levels affect the capital structure of firms, which creates an endogenous relationship between capital structure and credit rating levels. Therefore, I implement two specifications to take the endogenous relationship into account.

$$\begin{aligned} DEBTA_{i,t} &= \beta_0 + \beta_1 RATING_{i,t-1} + \beta_2 MOW_{i,t-1} + \beta_3 MOWSQ_{i,t-1} + \beta_4 EXT_{i,t-1} \\ &+ \beta_5 DI + \beta_6 (DI * MOW)_{i,t-1} + \beta_7 (DI * MOWSQ)_{i,t-1} + \beta_8 DML/S \\ &+ \beta_9 (DML/S * ISH)_{i,t-1} + \beta_{10} GOV_{i,t-1} + \beta_{11} SIZE_{i,t-1} + \beta_{12} ROA_{i,t-1} \\ &+ \beta_{13} TANG_{i,t-1} + \beta_{14} RD_{i,t-1} + \beta_{15} HDT_{i,t-1} + \beta_{16} IDT_{i,t-1} + \beta_{17} RI_{i,t-1} \\ &+ \beta_{18} IMB_{i,t-1} + \beta_{19} QCK_{i,t-1} + \beta_{20} INTST_{i,t-1} + \beta_{21} INDUSTRY_{i,t-1} \\ &+ \beta_{22} TIME_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{3.2.1}$$

$$\begin{aligned} DEBTA_{i,t} &= \beta_0 + \beta_1 RATING_{i,t-1} + \beta_2 MOW_{i,t-1} + \beta_3 MOWSQ_{i,t-1} + \beta_4 EXT_{i,t-1} \\ &+ \beta_5 DI + \beta_6 (DI * MOW)_{i,t-1} + \beta_7 (DI * MOWSQ)_{i,t-1} + \beta_8 DML/S \\ &+ \beta_9 (DML/S * ISH)_{i,t-1} + \beta_{10} BOD_{i,t-1} + \beta_{11} IND_{i,t-1} + \beta_{12} AUD_{i,t-1} \\ &+ \beta_{13} AIN_{i,t-1} + \beta_{14} CEO_{i,t-1} + \beta_{15} SIZE_{i,t-1} + \beta_{16} ROA_{i,t-1} + \beta_{17} TANG_{i,t-1} \\ &+ \beta_{18} RD_{i,t-1} + \beta_{19} HDT_{i,t-1} + \beta_{20} IDT_{i,t-1} + \beta_{21} RI_{i,t-1} + \beta_{22} IMB_{i,t-1} \\ &+ \beta_{23} QCK_{i,t-1} + \beta_{24} INTST_{i,t-1} + \beta_{25} INDUSTRY_{i,t-1} + \beta_{26} TIME_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{3.2.2}$$

In the first stage, as shown in equation 3.2.1 and equation 3.2.2, I lag the independent variables by one year earlier than the dependent variable, which is the capital structure of firms. The idea behind this methodology is that the level of credit rating in earlier year could not be influenced by debt ratio in subsequent year, and therefore, the concern for endogeneity should be minimized.

In the second stage, I implement the dynamic model approach, which is the Arellano-Bond Generalized Method of Moments (GMM) estimation. In this approach, I include only the panel data with consecutive time series observations. As the independent variables consist of

the lagged dependent variable as well as lagged independent variables, the further lags of lagged dependent and independent variables are used as instruments, this makes the endogenous variables predetermined and not correlated with the error terms. Besides, the industry dummies are dropped in the GMM models, in order to control for the time-invariant industry-specific effects, all the variables including the dependent and independent variables are taking first differences, by which the fixed industry-specific effects are removed as these are not vary over time. Furthermore, in order to check for autocorrelation and validity of instruments, I report the first and second-order autocorrelations and Sargan test statistics as part of the post estimation of the results.

Although alternative specifications can be used to solve the endogeneity problem between capital structure and credit quality, for example, instrumental variables regressions including two-stage least squares, three-stage least squares and IV GMM, and however, in reality the variables correlated with the levels of credit rating and perfectly uncorrelated with the capital structure are rare, as the determinants of levels of credit ratings may also determine the firm's capital structure (Hovakimian, 2009).

In addition, as recommended by Ozkan (2001), not only I consider the credit quality as the endogenous variable, the other variables, such as the firm characteristics, should also be treated as endogenous, as the shocks affecting the financial choice of firms are also likely to affect the other firm characteristics. The potential endogenous problem may arise when capital structure affect the other independent variables included in the analysis excluding the credit quality. For example, increases in financial leverage may decrease the need of corporate governance to monitor and control the managerial consumption, when debt and corporate

governance mechanisms act as substitutes of each other. One would expect the increases in financial leverage decrease the corporate governance quality of firms. However, this may due to the influence of financial leverage on corporate governance, rather than vice versa. Besides, one may also expect the increases in financial leverage increase the risk of bankruptcy and bankruptcy costs, which decrease the firm's ability to generate profit and subsequently lead to lower firm size, profitability, stock return, market value of equity, quick ratio, and interest coverage and so on and so forth. Moreover, the increases in financial leverage secured by collateralizations decrease firm's debt capacity, which may ultimately determine and change the firm's composition of tangible and intangible assets. Furthermore, higher leverage may increase the risks of financial distress, and as a result, decrease the opportunities to invest in profitable projects. Therefore, in an attempt to mitigate the probability of the influence of financial leverage on the firm characteristics, in addition to the lagged independent variables approach, the Arellano-Bond Generalized Method of Moments (GMM) approach is implemented to address the endogeneity issue.

In the result section, I determine whether to use fixed effects or random effects panel regression by conducting Hausman tests for each of the panel regression, and I report p-values under each of the regression result. If the p-value suggests to reject the null hypothesis, it is suggested to use fixed effects. If the null hypothesis could not be rejected, it is recommended to use random effects.

3.3.4.4 Effects Prior and During the Financial Crisis

After the global financial crisis in 2008, the requirement for capital reserve ratio and financial leverage of financial institutions has generally increased under government and international

legislations, for example, Basel III standard on bank liquidity and bank leverage. Due to such requirements, banks are more concerned about their capital reserve and financial leverage ratios, and they are more constrained while lending their money to corporates. Therefore, the lending requirement for corporates becomes more stringent during the financial crisis, only large firms with good credit records are able to obtain their funding from banks, small and medium sized businesses may find very difficult to get their external financing, although the governments are encouraging banks to lend aggressively to simulate the growth of small and medium sized businesses and the economy. In short, there are fewer supply of debt capital available for borrowing by the industrial corporates, and some firms may find constrained to borrow from the financial institutions in the UK, especially for the period after financial crisis. Therefore, I expect the small and medium sized and financial constrained firms tend to issue equity to finance them due to the limited source of available debt capital, and hence, these firms tend to become less levered after financial crisis.

In addition, having received a lot of attentions from the public investors during the financial crisis due to lack of rating timeliness and accuracy of credit rating agencies, the credit rating agencies tend to assess the credit quality of corporates and financial products more promptly and accurately, and hence there are fewer opportunities for the credit rating issuers to engage in rating shopping from various credit rating agencies. Furthermore, in terms of government enforcements on credit rating agencies, government is setting new legislations to facilitate rating timeliness and accuracy. For example, Bolton et al (2012) report the US government is implementing Cuomo Plan between New York State Attorney and big three rating agencies, named as Moody's, S&P's and Fitch, for their rating incomes to be paid before their rating issuance to debt issuers that would reduce the incentives of the rating agencies to inflate their

credit ratings to favour their paying clients who are long-term debt issuers. Therefore, it is expected that it is not uncommon that firms' credit ratings to be downgraded by the credit rating agencies during and after 2008.

As discussed, both of the variables for capital structure and credit quality may have changed significantly after the financial crisis in 2008, therefore, in order to control for such difference, I divide the entire sample period of 2002 to 2011 into two separate periods of 2002 to 2007 and 2008 to 2011 respectively, and then, I conduct the regression analysis for the two periods separately and report them in the result section.

3.4 Results and Discussions

3.4.1 Effects of Credit Rating and Corporate Governance on Capital Structure

3.4.1.1 Univariate Results

Table 3.4 below shows the median comparison between the rated and unrated firms for three different periods. For the sample period of 2005 to 2011, rated firms have 5% more median total debt ratio compared to unrated firms, which is significant at 1% level. The result is consistent with the first hypothesis that the firms with credit ratings tend to be more levered than the firms without credit ratings. In terms of long-term debt ratio, the median ratio of rated firms is 5% higher than the median ratio of unrated firms that is significant at 1% level, which is in line with the prediction that the firms with credit ratings tend to have more long-term debt on their capital structure than the firms without credit ratings. For the sample period between 2005 and 2007, the median total debt ratio of rated firms is 5% higher than the median ratio of unrated firms, and the median long-term debt ratio of rated firms is 3% higher

than the median ratio of unrated firms. For the sample period between 2008 and 2011, the median total debt ratio is 6% higher than the median ratio of unrated firms, and the median long-term debt ratio of rated firms is 7% higher than the median ratio of unrated firms, which is consistent with the prediction that rated firms is more levered than unrated firms, and the leverage difference between the rated firms and unrated firms tend to become greater for the period during the financial crisis than the period before the financial crisis.

Table 3.4
Wilcoxon-Mann-Whitney Test for Rated Firms and Unrated Firms

Wilcoxon-Mann-Whitney Test between 2005 and 2011		
	Rated Firms	Unrated Firms
DEBTA	0.26	0.21***
LDEBTA	0.21	0.16***
MOW	0.00	0.01***
EXT	0.28	0.39***
GOV	3.00	4.00***
BOD	11.00	8.00***
IND	0.57	0.55***
AUD	0.38	0.43***
AIN	1.00	1.00
CEO	1.00	1.00
SIZE	6.77	5.81***
ROA	0.07	0.06*
TANG	0.37	0.21***
RD	0.00	0.00
HDT	-0.00	-0.00
IDT	0.05	0.01***
RI	0.06	0.05
IMB	0.07	-0.33***
QCK	0.72	0.83***
INTST	5.28	6.47
Observations	144	772

Significantly different from the value for rated firms at 1% (***), 5% (**) and 10% (*) respectively.

(Table 3.4 continued)

Wilcoxon-Mann-Whitney Test between 2005 and 2007		
	Rated Firms	Unrated Firms
DEBTA	0.25	0.20***
LDEBTA	0.20	0.17***
MOW	0.00	0.01***
EXT	0.23	0.34***
GOV	3.00	4.00***
BOD	11.00	8.00***
IND	0.55	0.50
AUD	0.40	0.43**
AIN	1.00	1.00
CEO	1.00	1.00
SIZE	6.62	5.81***
ROA	0.08	0.07
TANG	0.38	0.22***
RD	0.00	0.00
HDT	-0.01	0.00
IDT	0.04	0.01**
RI	0.10	0.10
IMB	0.21	-0.22***
QCK	0.74	0.85*
INTST	5.50	6.84
Observations	54	332
Wilcoxon-Mann-Whitney Test between 2008 and 2011		
	Rated Firms	Unrated Firms
DEBTA	0.27	0.21***
LDEBTA	0.22	0.15***
MOW	0.00	0.01***
EXT	0.30	0.41***
GOV	3.00	4.00***
BOD	11.00	8.00***
IND	0.60	0.56***
AUD	0.38	0.43***
AIN	1.00	1.00
CEO	1.00	1.00
SIZE	6.82	5.81***
ROA	0.06	0.06*
TANG	0.36	0.21***
RD	0.00	0.00
HDT	0.00	-0.00
IDT	0.05	0.01***
RI	0.03	-0.04**
IMB	0.01	-0.39***
QCK	0.69	0.82*
INTST	5.28	5.84
Observations	90	440

Significantly different from the value for rated firms at 1% (***), 5% (**) and 10% (*) respectively.

In terms of the comparison of the results for the sample periods of 2002 to 2007 and 2008 to 2011, the leverage difference between rated firms and unrated firms for the two periods differ significantly, as the total leverage difference between rated firms and unrated firms for 2008

to 2011 is 1% more than the total leverage difference for the period before the financial crisis, and the long-term leverage difference between rated firms and unrated firms for 2008 to 2011 is 4% more than the long-term leverage difference before the financial crisis. The results implies that the impact of credit rating on financial leverage is more important for the period during the financial crisis. During the financial crisis after 2008, banks are less willing to lend to corporate firms, and hence the amount of short-term debts available are very limited. As Faulkender and Petersen (2006, p.62) write, "bank-dependent firms have less access to debt capital and thus would be increasingly under-levered relative to firms with access to the bond market". Similarly, as Leary (2009, p.1180) reports, "the magnitude of the leverage difference between firms with and without public debt market access is greater in periods of tight credit conditions and reduced loan supply and dampened in periods of looser credit". Therefore, the firms without credit ratings do not have access to the long-term public debt markets and may find themselves financially constraint, because they cannot raise external funding to finance their investments. Thus, unrated firms may be significantly affected by the limited supply of debt capital during the period of credit crunch and become increasingly less levered than rated firms. Nevertheless, the rated firms may not find themselves significantly affected by the limited supply of short-term bank loans, because they can use their credit ratings to access to the bond markets and are not affected by the contraction in short-term bank loans during the financial crisis.

Furthermore, for the three different sample periods, the proportion of the number of rated firms within total rated and unrated firms is the highest for the sample period of 2008 to 2011, which is 20.5%, followed by 18.7% from 2005 to 2011 and 16.3% from 2005-2007. The result shows that there is an increasingly more number of firms that are rated over the sample

periods, which is consistent with the finding of Judge and Mateus (2009) that the number of rated firms is growing significantly in recent years.

In terms of corporate governance variables, surprisingly, I find that rated firms tend to have lower corporate governance quality than unrated firms. As corporate governance is one of the most important criteria as part of the S&P's credit rating model, I would expect rated firms are likely to have better corporate governance quality than unrated firms, and as argued by Ashbaugh-Skaife et al (2006), the level of credit rating is positively related to the corporate governance quality of firms. In contrast, the results indicate that rated firms tend to have lower corporate governance quality than unrated firms and are more in line with substitution hypothesis, that firms with good corporate governance tend to have lower needs to use external debts as corporate governance mechanism to monitor and control the managerial consumption and to reduce the agency costs. Also, I find that rated firms have larger board size and lower proportion of audit committee members on board than unrated firms, which may indicate lower corporate governance quality. However, the results shows that rated firms have higher fraction of independent non-executive directors on board than unrated firms, whereas this relationship is only significant for the whole sample period and the period during the financial crisis.

With regards to the managerial ownership and substantial shareholdings, I find that across all the three sample periods, rated firms tend to have lower managerial ownership and substantial shareholdings than unrated firms, which provide additional supports that rated firms have lower corporate governance quality than unrated firms. The higher the managerial ownership, the better the alignment of interests between corporate managers and external shareholders,

and therefore, higher managerial ownership provides better incentive alignment, which would reduce the conflict of interests and agency costs. Moreover, substantial shareholders act as the safeguard to limit managers serving their personal interests, and the higher level of substantial shareholdings would better protect the interests of other small shareholders, which leads to better corporate governance that alleviates the agency costs. The non-parametric results shows that rated firms have lower corporate governance quality, which implies that rated firms have propensity to use debt as a controlling mechanism to mitigate the conflict of interests between managers and shareholders in order to compensate weak corporate governance mechanisms.

The firm characteristics between rated firms and unrated firms are also different, for example, I find rated firms with public debt market access are larger, have more tangible assets, higher stock return and industry-adjusted market to book ratio. However, I find that rated firms tend to have less liquid assets, which may indicates that rated firms tend to issue public debt to enhance financial flexibility and maintain financial slack to avoid the future needs of external capital, such as future expansions and acquisitions (Myers and Majluf, 1984). As Graham and Harvey (2002) point out, financial flexibility and credit rating are the two most important considerations for the managers while issuing debt, and managers tend to issue debt when they feel that the firms' internal funds are insufficient.

In the following section, I will present the multivariate tests to examine whether there is a significant relationship between capital structure and bond market access as measured by the corporate credit rating.

3.4.1.2 Multivariate Results

Table 3.5 below presents the results using panel regression estimation techniques with robust standard errors controlling for heteroscedasticity in order to test for the relationship between capital structure and credit rating with total debt ratio as dependent variable. The p-values of Hausman tests for the panel regressions are significant at 1% across all the models, which suggest that the fixed firm effects should be used across the panel regressions. The variable CEO is not included in the analysis in model 4 as the variation of CEO is very low, this results from that CEO is not the chairman on board in the most of sample firms.

As the results show, the bond market access is positively associated with the total debt ratio for the sample period of 2005 to 2011, which is significant at 1% level. The results are consistent with the prediction that firms with credit ratings tend to be more levered than firms without credit ratings, and rated firms is 0.8% more levered than unrated firms over the period of 2005 to 2011. However, I did not find the significant positive relationship between total debt ratio and bond market access for the sample periods of 2005 to 2007 and 2008 to 2011.

In addition, I find negative associations between total debt ratio and corporate governance index for the sample periods of 2005 to 2011 and 2008 to 2011, which are statistically significant at 5% level. The negative associations indicate that firms with good corporate governance are less levered because corporate governance mechanisms and debt often act as substitutes of each other in monitoring and controlling the managers in serving their personal interests to the detriments of external shareholders, such as managerial consumption of perquisites, investing in unprofitable projects and corporate fraud and abuse.

Table 3.5
Regression Results for Effects of Credit Rating and Corporate Governance on Capital Structure with Total Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
ACS	0.008*	0.008*	-0.017	-0.018	-0.001	-0.002
	(0.066)	(0.075)	(0.180)	(0.172)	(0.927)	(0.735)
MOW	-0.003	-0.005	-0.050*	-0.041	-0.001	-0.001
	(0.867)	(0.776)	(0.085)	(0.161)	(0.980)	(0.968)
EXT	-0.006	-0.005	-0.040***	-0.036***	0.013	0.013
	(0.347)	(0.420)	(0.004)	(0.010)	(0.124)	(0.122)
GOV	-0.002**		-0.000		-0.003**	
	(0.033)		(0.841)		(0.012)	
BOD		0.000		-0.000		0.002*
		(0.740)		(0.808)		(0.053)
IND		0.005		0.030*		0.011
		(0.535)		(0.070)		(0.382)
AUD		0.001		-0.009		-0.018
		(0.913)		(0.631)		(0.204)
AIN		-0.007**		-0.006		-0.009*
		(0.015)		(0.300)		(0.082)
CEO		-0.013				-0.008
		(0.136)				(0.592)
SIZE	0.003	0.004	0.006	0.006	0.007	0.009
	(0.589)	(0.384)	(0.660)	(0.692)	(0.334)	(0.243)
ROA	0.011	0.011	0.006	-0.001	0.001	-0.001
	(0.487)	(0.507)	(0.882)	(0.986)	(0.979)	(0.976)
TANG	0.004	0.006	-0.024	-0.025	0.040*	0.040*
	(0.733)	(0.626)	(0.334)	(0.319)	(0.071)	(0.071)
RD	0.064	0.057	0.675***	0.621***	-0.026	-0.027
	(0.199)	(0.254)	(0.001)	(0.004)	(0.641)	(0.627)
HDT	0.137***	0.137***	0.349***	0.350***	0.166***	0.170***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDT	0.845***	0.844***	0.655***	0.653***	0.795***	0.792***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.009***	-0.009***	-0.012	-0.012	-0.005	-0.004
	(0.005)	(0.005)	(0.235)	(0.243)	(0.127)	(0.183)
IMB	0.001	0.001	0.001	0.001	0.002	0.002
	(0.266)	(0.241)	(0.471)	(0.549)	(0.140)	(0.171)
QCK	-0.007***	-0.007**	-0.002	-0.004	-0.007**	-0.007**
	(0.010)	(0.013)	(0.695)	(0.511)	(0.028)	(0.036)
INTST	-0.000***	-0.000***	-0.001***	-0.001***	-0.000**	-0.000**
	(0.000)	(0.000)	(0.002)	(0.003)	(0.017)	(0.024)
Constant	0.193***	0.190***	0.192**	0.190**	0.187***	0.172***
	(0.000)	(0.000)	(0.020)	(0.021)	(0.000)	(0.000)
Hausman	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.863	0.888	0.789	0.793	0.894	0.889
Rated Firms	144	144	54	54	90	90
Unrated Firms	772	772	332	332	440	440
Obs.	916	916	386	386	530	530

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

The economic significance of the results is greater for the sample period of 2008 to 2011 than the period of 2005 to 2011. Firms with the highest corporate governance quality tend to be 1.5% less levered than firms with the lowest corporate governance quality during the financial crisis, whereas the firms with the highest governance quality tend to be 1% less levered than their counterparts for the whole sample period. The greater economic significance for the sample period of 2008 to 2011 shows that as the costs of debt financing increased during the financial crisis, firms with good corporate governance tend to avoid using more debt and reduce their debt levels, and firms with weak corporate governance are likely to use more debt to monitor the managerial behaviour and reduce the agency costs, because it is more risky for the managers to invest in value decreasing activities during the financial crisis.

The overall corporate governance index provides an aggregate measure of firm's corporate governance quality, I also check for the significance of results for the individual corporate governance characteristics. I find that board size and fraction of independent non-executive directors on board are positively related to total debt ratio, and independence of audit committee is negatively related to total debt ratio. The effects of board size and independence of audit committee on leverage are more in line with the substitution hypothesis that firms substitute debt with corporate governance mechanisms in alleviating the agency costs, and the effect of the fraction of independent non-executive directors on board on leverage supports that firms with good corporate governance are able to raise more debt because of the reduction in agency costs of debt financing. Moreover, the greater economic significance of the effect of audit committee independence on leverage during the financial crisis supports the previous argument that firms with good corporate governance tend to reduce their debt financing and firms with weak corporate governance are likely to use more debt to monitor

and control the managerial consumption due to the increased financial risks.

As expected, I find that managerial ownership and substantial shareholdings are negatively related to total debt ratio. Contrary to the findings of Firth (1995) and Brailsford et al (2002) that at higher level of managerial ownership, managers tend to become entrenched and pursue low level of debt because of the bankruptcy risks associated with debt, the results are more in line with the substitution between debt and corporate governance mechanisms. For example, high levels of managerial ownership and substantial shareholdings indicate good corporate governance mechanisms, as higher level of managerial ownership aligns the interests between managers and shareholders together, and high level of substantial shareholdings provides effective monitoring from substantial shareholders, and therefore, from the results shown in table 3.5, I would suggest that firms use debt to substitute for the weak corporate governance, such as low levels of managerial ownership and substantial shareholdings. Overall, the results from the corporate governance variables provide supports for the substitution hypothesis that firms tend to substitute debt for corporate governance mechanisms to monitor the managerial consumption and reduce the agency costs.

Furthermore, I find significant relationships between capital structure and firm characteristics. For example, I find that research and development expense is positively related to total debt ratio, and also, stock return, quick ratio and interest coverage ratio are negatively related to total debt ratio. The positive relationship between total debt ratio and growth opportunities suggests that firms with high growth opportunities may use debt as a disciplinary mechanism to limit managerial discretion to the detriments of external shareholders and reduce problem of overinvestment. The negative relationship between total debt ratio and stock return shows

that firms issue equity after periods of high stock return that increases the value of total assets. Firms with higher liquidity ratio tend to finance themselves with retained earnings rather than external financing, which leads to a negative relationship between total debt ratio and quick ratio. Moreover, the negative relationship between total debt ratio and interest coverage ratio indicates that firms with lower interest coverage ratio have higher financial leverage, which is consistent with the finding of Judge and Mateus (2009) that firms with lower interest coverage ratio pay out more interests as they have more debt on their capital structure than firms with higher interest coverage ratio.

The positive relationship between total debt ratio and deviation from target capital structure shows that overlevered firms tend to be more levered than their counterparts in the following year. More importantly, the results suggest that firms do not deviate from their target capital structure, as the coefficients on the deviation from target capital structure are smaller than 1. For instance, the leverage difference between a firm that is 5% overlevered and a firm that is 5% underlevered is 10%, and in the following year, the leverage difference reduces to 1.37% as shown on HDT and 8.45% as shown on IDT for the sample period between 2005 and 2011, which show that in the following year overlevered firm tends to reduce its debt ratio or underlevered firm tends to increase its debt ratio or both. The results are consistent with the trade-off theory that firms have target capital structure and maintain their target capital structure through adjustments to the target levels.

Table 3.6
Regression Results for Effects of Credit Rating and Corporate Governance on Capital Structure with Long-Term Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *LDEBTA*						
ACS	0.043**	0.040**	-0.007	-0.009	0.035	0.030
	(0.030)	(0.042)	(0.890)	(0.862)	(0.269)	(0.339)
MOW	-0.057	-0.029	0.111	0.087	-0.100	-0.070
	(0.458)	(0.706)	(0.329)	(0.451)	(0.584)	(0.705)
EXT	0.016	0.021	-0.033	-0.025	0.054	0.059
	(0.539)	(0.426)	(0.541)	(0.647)	(0.212)	(0.177)
GOV	-0.002		-0.004		-0.005	
	(0.517)		(0.555)		(0.348)	
BOD		-0.002		0.000		0.004
		(0.398)		(0.971)		(0.336)
IND		0.014		-0.047		0.077
		(0.708)		(0.467)		(0.219)
AUD		0.009		-0.038		0.021
		(0.817)		(0.593)		(0.767)
AIN		-0.026*		-0.043*		-0.017
		(0.052)		(0.051)		(0.525)
CEO		0.101***				0.062
		(0.008)				(0.423)
SIZE	0.072***	0.079***	-0.030	-0.016	0.100***	0.105***
	(0.001)	(0.001)	(0.590)	(0.782)	(0.010)	(0.006)
ROA	-0.046	-0.066	-0.140	-0.197	0.023	-0.005
	(0.528)	(0.361)	(0.360)	(0.209)	(0.818)	(0.961)
TANG	-0.042	-0.037	-0.214**	-0.206**	0.211*	0.176
	(0.465)	(0.521)	(0.028)	(0.034)	(0.063)	(0.125)
RD	-0.170	-0.195	0.402	0.463	-0.157	-0.127
	(0.440)	(0.372)	(0.622)	(0.584)	(0.578)	(0.655)
HDT	0.246***	0.228***	0.261*	0.249*	0.175	0.194
	(0.000)	(0.000)	(0.058)	(0.069)	(0.174)	(0.134)
IDT	-0.052	-0.033	-0.151	-0.165	-0.122	-0.120
	(0.421)	(0.607)	(0.262)	(0.220)	(0.346)	(0.359)
RI	-0.013	-0.013	-0.045	-0.054	-0.013	-0.010
	(0.374)	(0.368)	(0.260)	(0.180)	(0.432)	(0.541)
IMB	0.005	0.005	-0.006	-0.004	0.005	0.004
	(0.236)	(0.192)	(0.413)	(0.584)	(0.453)	(0.547)
QCK	-0.023*	-0.023**	-0.071***	-0.069***	-0.026	-0.025
	(0.052)	(0.044)	(0.001)	(0.002)	(0.141)	(0.145)
INTST	-0.000	-0.000	0.001	0.001	-0.000	-0.000
	(0.902)	(0.972)	(0.518)	(0.474)	(0.567)	(0.706)
Constant	-0.203	-0.327**	0.506	0.481	-0.444*	-0.618**
	(0.126)	(0.017)	(0.117)	(0.135)	(0.063)	(0.013)
Hausman	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.675	0.678	0.679	0.682	0.701	0.705
Rated Firms	144	144	54	54	90	90
Unrated Firms	772	772	332	332	440	440
Obs.	916	916	386	386	530	530

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

In table 3.6, I use another measure of capital structure, which is long-term debt ratio as dependent variable to check the robustness of the results and see whether the results are different from the one using total debt ratio. As suggested by Mittoo and Zhang (2010), the credit ratings of firms, as a proxy for the bond market access, are more likely to affect the long-term debt ratio rather than the total debt ratio, however, I use both of the total debt ratio and long-term debt ratio because most of the UK firms borrow from banks rather than from long-term public debt markets, and hence the long-term debt ratio may be much smaller than the total debt ratio compared to that of the US firms. Similarly, I use panel regressions to examine for the relationship between long-term debt ratio and credit rating. The Hausman tests for the panel regressions suggest to use fixed effects rather than random effects.

As the results from table 3.6 suggest, there is a positive relationship between long-term debt ratio and credit rating, which is statistically significant at 5% level for the sample period between 2005 and 2011. However, I did not find any significant relationship between long-term debt ratio and credit rating for the sample periods of 2005 to 2007 and 2008 to 2011. In comparison between the coefficients of ACS in table 3.5 and coefficients in table 3.6, the coefficients of ACS using long-term debt ratio as dependent variable is greater than the coefficient of ACS using total debt ratio. For example, over the period of 2005 to 2011, firms with credit ratings tend to have approximately 4.3% more long-term leverage than firms without credit ratings. Nevertheless, as shown in table 3.5, firms with credit ratings have only 0.8% more total leverage than firms without credit ratings. The difference in the economic significance of the results is consistent with the evidence that the credit ratings are more likely to affect the firms' long-term debt ratio rather than the total debt ratio. Also, it can also explain that rated firms have more long-term debt on their capital structure than unrated firms,

and unrated firms may have more short-term debt on their capital structure than rated firms. As reported by Judge and Mateus (2009), the long-term debt ratings of firms can facilitate the short-term borrowings from banks and help banks determine more attractive lending propositions, and therefore, although the rated firms may have a smaller amount of short-term debt on their capital structure than unrated firms, the rated firms may have potential to borrow from short-term lenders more easily if they need to have access to the short-term loan market.

Contrary to the previous results, I did not find any significant associations between long-term debt ratio and corporate governance variables, including corporate governance index, managerial ownership and substantial shareholdings across all sample periods. This is also the main reason causing the reductions in R squares. The R squares explain approximately 70% of the variability of the dependent variable long-term debt ratio, compared to around 80% of the variability of total debt ratio in table 3.5. The results suggest that the corporate governance variables are more likely to affect the total debt ratio rather than the long-term debt ratio. Nevertheless, I find limited evidence of the influence of some of the corporate governance characteristics on long-term debt ratio. For example, I find that audit committee independence is negatively related to long-term debt ratio, and CEO duality is positively related to long-term debt ratio.

In terms of the firm characteristics, I find that firm size and deviation from the historical average debt ratio are positively associated with long-term debt ratio, and quick ratio is negatively associated with long-term debt ratio. The expected signs for deviation from target capital structure and quick ratio are consistent with the previous table. Differently, firm size does not affect total debt ratio, whereas it is positively associated with long-term debt ratio.

The positive relationship is consistent with the prediction that larger firms are able to issue debt more easily than smaller firms, as larger firms have lower probability of bankruptcy and are more capable to taking additional debt, especially the long-term debt. Another difference point is that the interest coverage ratio has significant negative impact on total debt ratio, and however, it does not have any influence on long-term debt ratio, which may indicate that interest coverage ratio is more likely to affect the short-term proportion of the total debt, rather than long-term debt.

Interestingly, I find that asset tangibility is negatively related to long-term debt ratio for sample period 2005 to 2007, and positively related to long-term debt ratio for sample period 2008 to 2011. The results suggest that during the financial crisis, firms with more tangible assets that can be used as collateralizations are able to raise more debt as the creditors have more stringent lending requirements. However, before the financial crisis, the negative relation between asset tangibility and long-term debt ratio shows that as it is more difficult to monitor the managerial behaviour in firms with less collaterals, and therefore, debt is used as a substitute to prevent the managerial discretion and reduce the agency costs.

The effects on leverage between investment grade firms and speculative grade firms could offset each other, as the effects of investment grade ratings and speculative grade ratings may have completely opposite signs. Therefore, in order to control for the offsetting effects on leverage between investment grade firms and speculative grade firms, I run two set of separate regressions for investment grade firms and unrated firms, and speculative grade firms and unrated firms respectively.

Table 3.7
Regression Results for Effects of Investment Grade Rating and Corporate Governance on Capital Structure with Total Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
ACCI	0.013**	0.013**	-0.027	-0.026	-0.001	-0.003
	(0.013)	(0.011)	(0.188)	(0.207)	(0.933)	(0.710)
MOW	-0.003	-0.005	-0.050*	-0.042	0.001	0.001
	(0.859)	(0.779)	(0.081)	(0.150)	(0.968)	(0.984)
EXT	-0.005	-0.004	-0.039***	-0.035**	0.013	0.013
	(0.434)	(0.520)	(0.005)	(0.012)	(0.127)	(0.122)
GOV	-0.002**		-0.000		-0.003***	
	(0.038)		(0.858)		(0.010)	
BOD		0.000		-0.000		0.002*
		(0.673)		(0.912)		(0.051)
IND		0.006		0.030*		0.013
		(0.469)		(0.070)		(0.298)
AUD		0.000		-0.007		-0.020
		(0.973)		(0.677)		(0.159)
AIN		-0.007**		-0.005		-0.009*
		(0.016)		(0.332)		(0.068)
CEO		-0.013				-0.007
		(0.135)				(0.629)
SIZE	0.001	0.002	0.001	0.000	0.006	0.008
	(0.855)	(0.595)	(0.938)	(0.982)	(0.409)	(0.312)
ROA	0.017	0.016	-0.001	-0.006	0.000	-0.001
	(0.308)	(0.327)	(0.971)	(0.871)	(0.982)	(0.946)
TANG	0.001	0.003	-0.027	-0.027	0.044*	0.043*
	(0.926)	(0.810)	(0.280)	(0.273)	(0.052)	(0.056)
RD	0.064	0.057	0.684***	0.627***	-0.029	-0.031
	(0.199)	(0.255)	(0.001)	(0.004)	(0.605)	(0.578)
HDT	0.134***	0.134***	0.346***	0.348***	0.169***	0.174***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDT	0.851***	0.850***	0.664***	0.661***	0.796***	0.792***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.008***	-0.009***	-0.009	-0.009	-0.004	-0.004
	(0.010)	(0.009)	(0.362)	(0.384)	(0.177)	(0.252)
IMB	0.001	0.001	0.001	0.001	0.002	0.002
	(0.261)	(0.239)	(0.480)	(0.568)	(0.156)	(0.194)
QCK	-0.006**	-0.006**	-0.003	-0.004	-0.006*	-0.006*
	(0.017)	(0.022)	(0.637)	(0.471)	(0.073)	(0.092)
INTST	-0.000***	-0.000***	-0.001***	-0.001***	-0.000**	-0.000**
	(0.000)	(0.000)	(0.001)	(0.003)	(0.020)	(0.030)
Constant	0.201***	0.197***	0.223***	0.221**	0.189***	0.174***
	(0.000)	(0.000)	(0.009)	(0.011)	(0.000)	(0.001)
Hausman	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.888	0.888	0.787	0.791	0.900	0.894
Rated Firms	121	121	48	48	73	73
Unrated Firms	772	772	332	332	440	440
Obs.	893	893	380	380	513	513

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

In line with the previous findings, table 3.7 shows firms with investment grade ratings specifically have higher total debt ratio than unrated firms. In comparison between the sample of investment grade firms and the sample of total rated firms, According to the economic significance, I find the effect of investment grade rating on leverage is stronger than the effect of credit rating on leverage. For example, for the sample period of 2005 to 2011, investment grade firms have 1.3% more total debt ratio than unrated firms, whereas total rated firms have 0.8% more total debt ratio than unrated firms, which implies that the effect of investment grade rating on total debt ratio is economically stronger than the effect of total credit rating on total debt ratio.

The negative effects of corporate governance variables, including corporate governance index, managerial ownership and substantial shareholdings on total debt ratio are very similar to the results presented in table 3.5. Besides, the effects of corporate governance characteristics on total debt ratio, including board size, fraction of independent non-executive directors on board and audit committee independence are consistent with the previous results.

In table 3.8, I implement long-term debt ratio as dependent variable to examine the leverage difference between firms with investment grade ratings and unrated firms, I present consistent results that investment grade firms have more long-term debt ratio than unrated firms. The effect of having investment grade ratings on long-term debt ratio is stronger than this effect on total debt ratio as shown in table 3.7, firms with investment grade ratings have 8% more long-term leverage than unrated firms for the sample period of 2005 to 2011, and firms with investment grade ratings have 1.3% more total leverage than unrated firms, which shows that investment grade ratings are more likely to affect long-term debt ratio than total debt ratio.

Table 3.8
Regression Results for Effects of Investment Grade Rating and Corporate Governance on Capital Structure with Long-Term Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *LDEBTA*						
ACCI	0.080***	0.077***	0.195**	0.207***	0.028	0.021
	(0.000)	(0.001)	(0.012)	(0.008)	(0.478)	(0.599)
MOW	-0.054	-0.027	0.110	0.097	-0.098	-0.069
	(0.481)	(0.727)	(0.318)	(0.382)	(0.596)	(0.715)
EXT	0.020	0.024	-0.042	-0.033	0.056	0.062
	(0.455)	(0.358)	(0.421)	(0.531)	(0.201)	(0.163)
GOV	-0.002		-0.004		-0.006	
	(0.507)		(0.507)		(0.285)	
BOD		-0.002		-0.003		0.004
		(0.407)		(0.471)		(0.335)
IND		0.012		-0.041		0.089
		(0.743)		(0.515)		(0.168)
AUD		0.005		-0.057		0.003
		(0.896)		(0.399)		(0.968)
AIN		-0.025*		-0.048**		-0.019
		(0.051)		(0.024)		(0.479)
CEO		0.100***				0.067
		(0.008)				(0.391)
SIZE	0.064***	0.072***	0.022	0.050	0.088**	0.093**
	(0.004)	(0.002)	(0.688)	(0.383)	(0.028)	(0.020)
ROA	0.001	-0.020	-0.070	-0.145	0.020	-0.011
	(0.988)	(0.778)	(0.640)	(0.340)	(0.847)	(0.914)
TANG	-0.054	-0.048	-0.175*	-0.169*	0.205*	0.169
	(0.344)	(0.403)	(0.065)	(0.072)	(0.078)	(0.150)
RD	-0.162	-0.186	0.348	0.451	-0.167	-0.144
	(0.456)	(0.390)	(0.660)	(0.581)	(0.559)	(0.616)
HDT	0.237***	0.218***	0.242*	0.224*	0.205	0.224*
	(0.000)	(0.000)	(0.071)	(0.092)	(0.123)	(0.094)
IDT	-0.043	-0.025	-0.198	-0.213	-0.138	-0.135
	(0.500)	(0.697)	(0.135)	(0.106)	(0.302)	(0.315)
RI	-0.012	-0.012	-0.056	-0.069*	-0.011	-0.008
	(0.386)	(0.379)	(0.158)	(0.082)	(0.499)	(0.621)
IMB	0.005	0.005	-0.006	-0.003	0.005	0.004
	(0.242)	(0.197)	(0.449)	(0.678)	(0.513)	(0.614)
QCK	-0.020*	-0.020*	-0.060***	-0.058***	-0.020	-0.020
	(0.089)	(0.078)	(0.005)	(0.007)	(0.275)	(0.281)
INTST	-0.000	-0.000	0.001	0.001	-0.000	-0.000
	(0.810)	(0.880)	(0.290)	(0.251)	(0.634)	(0.800)
Constant	-0.171	-0.294**	0.153	0.084	-0.372	-0.553**
	(0.207)	(0.035)	(0.639)	(0.795)	(0.133)	(0.032)
Hausman	0.000***	0.039**	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.676	0.679	0.677	0.680	0.707	0.711
Rated Firms	121	121	48	48	73	73
Unrated Firms	772	772	332	332	440	440
Obs.	893	893	380	380	513	513

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

In addition, the effect of investment grade rating on long-term debt ratio is economically stronger than the effect of total credit rating on long-term debt ratio. For example, firms with investment grade ratings have 8% more long-term leverage than their counterparts, and firms with total credit rating have 4.3% more long-term leverage than unrated firms. The results show that the economic significance of the influence of investment grade rating on long-term leverage is the strongest among the previous models.

Interestingly, I find that for the sample period of 2005 to 2007, there is a positive relationship between long-term debt ratio and investment grade rating. The leverage difference between investment grade firms and unrated firms is greater for the period of 2005 to 2007 than the period of 2005 to 2011. However, the relationship between long-term leverage and investment grade rating is not significant for the sample period of 2008 to 2011, and therefore, it is not possible to compare the effect of investment grade rating on long-term debt ratio before and during the financial crisis.

With regards to the corporate governance variables, I did not find any significant relationship between long-term debt ratio and corporate governance index, managerial ownership or substantial shareholdings, which provide additional support that the corporate governance variables are more likely to affect total debt ratio rather than long-term debt ratio. Similar to the results reported in table 3.6, I find that audit committee independence is negatively related to long-term debt ratio, and CEO duality is positively related to long-term debt ratio.

Table 3.9
Regression Results for Effects of Speculative Grade Rating and Corporate Governance on Capital Structure with Total Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
ACCS	-0.004	-0.006	-0.012	-0.015	-0.002	-0.002
	(0.579)	(0.457)	(0.474)	(0.390)	(0.831)	(0.843)
MOW	-0.005	-0.007	-0.049*	-0.037	0.000	0.008
	(0.764)	(0.710)	(0.087)	(0.206)	(0.996)	(0.846)
EXT	-0.004	-0.004	-0.037**	-0.032**	0.005	0.005
	(0.546)	(0.564)	(0.018)	(0.041)	(0.600)	(0.629)
GOV	-0.002**		-0.000		-0.003**	
	(0.022)		(0.992)		(0.015)	
BOD		-0.001		-0.001		0.001
		(0.361)		(0.496)		(0.421)
IND		0.009		0.038**		0.016
		(0.317)		(0.031)		(0.206)
AUD		-0.008		-0.010		-0.028*
		(0.418)		(0.602)		(0.065)
AIN		-0.011***		-0.007		-0.011*
		(0.001)		(0.256)		(0.072)
CEO		-0.013				-0.010
		(0.137)				(0.481)
SIZE	0.006	0.009*	0.004	0.005	0.015*	0.016**
	(0.249)	(0.074)	(0.785)	(0.753)	(0.053)	(0.034)
ROA	0.010	0.008	0.026	0.017	-0.014	-0.015
	(0.537)	(0.627)	(0.522)	(0.686)	(0.498)	(0.464)
TANG	0.009	0.011	-0.032	-0.033	0.051**	0.050**
	(0.500)	(0.420)	(0.201)	(0.183)	(0.022)	(0.028)
RD	0.032	0.022	0.705***	0.618**	-0.035	-0.037
	(0.531)	(0.663)	(0.003)	(0.011)	(0.519)	(0.495)
HDT	0.137***	0.137***	0.364***	0.362***	0.156***	0.160***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDT	0.847***	0.846***	0.655***	0.656***	0.804***	0.801***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.008**	-0.007**	-0.013	-0.012	-0.003	-0.002
	(0.024)	(0.027)	(0.230)	(0.243)	(0.293)	(0.466)
IMB	0.001	0.001	0.000	0.000	0.001	0.001
	(0.452)	(0.453)	(0.806)	(0.932)	(0.567)	(0.639)
QCK	-0.007***	-0.007**	-0.001	-0.002	-0.008**	-0.007**
	(0.008)	(0.018)	(0.918)	(0.691)	(0.022)	(0.038)
INTST	-0.000***	-0.000***	-0.001***	-0.001***	-0.000**	-0.000*
	(0.001)	(0.000)	(0.002)	(0.005)	(0.043)	(0.053)
Constant	0.175***	0.172***	0.199**	0.193**	0.145***	0.142***
	(0.000)	(0.000)	(0.019)	(0.023)	(0.002)	(0.003)
Hausman	0.000***	0.039**	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.884	0.885	0.777	0.785	0.894	0.892
Rated Firms	23	23	6	6	17	17
Unrated Firms	772	772	332	332	440	440
Obs.	795	795	338	338	457	457

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

From the results in table 3.9, the total debt ratio between firms with speculative grade ratings and unrated firms does not significantly different from each other, whereas I find a positive relationship between total debt ratio and investment grade rating, which shows that investment grade rating has more explanatory power than speculative grade rating, and the positive association between total debt ratio and credit rating is mainly driven by the firms with investment grade ratings rather than speculative grade ratings. The results on the effects of corporate governance variables are in line with the previous results.

The results shown in table 3.10 are based on using long-term debt ratio as dependent variable instead of total debt ratio, I find a negative relationship between long-term debt ratio and speculative grade rating over the period of 2005 to 2007, compared to a positive relationship between long-term debt ratio and investment grade ratings. As can be seen in table 3.10, speculative grade firms have 14.3% lower long-term leverage than unrated firms in model 3, and these firms have 15.6% lower long-term leverage than unrated firms in model 4. However, as shown in table 3.8, investment grade firms have 19.5% more long-term leverage than unrated firms in model 3, and 20.7% more long-term leverage than unrated firms in model 4.

The results imply that both investment grade rating and speculative grade rating determine long-term leverage of firms, especially the investment grade rating. Credit rating provides firms with access to both domestic and international long-term public debt markets, and for the UK firms, credit rating give them access to the largest debt capital market in the US (Judge and Korzhenitskaya, 2011).

Table 3.10
Regression Results for Effects of Speculative Grade Rating and Corporate Governance on Capital Structure with Long-Term Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *LDEBTA*						
ACCS	-0.051	-0.057	-0.143**	-0.156**	0.048	0.046
	(0.182)	(0.138)	(0.039)	(0.024)	(0.380)	(0.410)
MOW	-0.063	-0.046	0.092	0.084	-0.282	-0.250
	(0.444)	(0.584)	(0.433)	(0.480)	(0.202)	(0.278)
EXT	0.002	0.007	-0.059	-0.044	0.065	0.073
	(0.949)	(0.830)	(0.352)	(0.488)	(0.269)	(0.228)
GOV	-0.003		-0.005		-0.008	
	(0.511)		(0.511)		(0.223)	
BOD		-0.002		-0.005		0.006
		(0.492)		(0.322)		(0.294)
IND		-0.010		-0.054		0.061
		(0.811)		(0.449)		(0.407)
AUD		0.005		-0.085		0.020
		(0.905)		(0.265)		(0.823)
AIN		-0.032**		-0.054**		-0.033
		(0.033)		(0.024)		(0.348)
CEO		0.094**				0.064
		(0.020)				(0.441)
SIZE	0.082***	0.090***	-0.008	0.030	0.088**	0.092**
	(0.001)	(0.000)	(0.896)	(0.628)	(0.040)	(0.032)
ROA	-0.011	-0.031	-0.041	-0.138	0.057	0.025
	(0.890)	(0.692)	(0.808)	(0.416)	(0.626)	(0.831)
TANG	-0.038	-0.026	-0.184*	-0.177*	0.222*	0.185
	(0.534)	(0.668)	(0.072)	(0.078)	(0.080)	(0.150)
RD	-0.188	-0.215	-0.004	0.089	-0.148	-0.113
	(0.438)	(0.372)	(0.997)	(0.927)	(0.627)	(0.714)
HDT	0.256***	0.238***	0.242	0.213	0.191	0.221
	(0.000)	(0.001)	(0.103)	(0.146)	(0.193)	(0.136)
IDT	-0.090	-0.076	-0.156	-0.164	-0.153	-0.153
	(0.209)	(0.290)	(0.279)	(0.250)	(0.303)	(0.307)
RI	-0.015	-0.015	-0.061	-0.076*	-0.020	-0.016
	(0.346)	(0.350)	(0.157)	(0.074)	(0.273)	(0.396)
IMB	0.006	0.007	-0.007	-0.004	0.008	0.007
	(0.184)	(0.143)	(0.395)	(0.631)	(0.311)	(0.414)
QCK	-0.020	-0.020	-0.053**	-0.055**	-0.025	-0.025
	(0.116)	(0.124)	(0.035)	(0.029)	(0.209)	(0.226)
INTST	-0.000	-0.000	0.001	0.001	-0.000	-0.000
	(0.812)	(0.847)	(0.384)	(0.339)	(0.651)	(0.728)
Constant	-0.250*	-0.360**	0.351	0.271	-0.349	-0.523*
	(0.076)	(0.014)	(0.307)	(0.426)	(0.177)	(0.055)
Hausman	0.000***	0.039**	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.633	0.635	0.644	0.645	0.652	0.658
Rated Firms	23	23	6	6	17	17
Unrated Firms	772	772	332	332	440	440
Obs.	795	795	338	338	457	457

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

From the firm's point of view, investment grade ratings provide firms with better access to the external bond market. As long-term public debt has lower cost of borrowing, larger size of issue, longer maturity, less restrictive covenants and require less safe assets than short-term loans (Rajan and Winton, 1995; Faulkender and Petersen, 2005), it would be more favourable for the investment grade firms and increases the firms' supply of external capital. Therefore, investment grade firms that are more creditworthy tend to be more levered than unrated firms.

On the other hand, as the credit rating market in the UK is not as developed as the US credit rating market, firms obtain their credit ratings in the UK market are mainly large and creditworthy firms and most of them have investment grade ratings. In the total sample of rated firms, there are approximately 82% of firms have investment grade ratings, and 18% of firms have speculative grade ratings. The market participants may consider that speculative grade firms as more risky, and hence the speculative grade firms are likely to incur higher cost of borrowing and cost of financial distress imposed by low credit ratings. Therefore, the speculative grade firms tend to be more concerned about their costs of external debt financing, and maintain low levels of long-term financial leverage than unrated firms.

3.4.2 Effects of Credit Quality and Corporate Governance on Capital Structure

3.4.2.1 Univariate Results

Table 3.11 presents the Wilcoxon-Mann-Whitney test for the median comparison between investment grade firms and speculative grade firms. For all the three sample periods, that are 2005 to 2011, 2005 to 2007 and 2008 to 2011, I did not find that the median financial leverage of firms with investment grade ratings and firms with speculative grade ratings are

significantly different from each other. Across the three sample periods, the proportion of speculative grade firms to the total number of rated firms peaks for the later sample period of 2008 to 2011 (18.9%), as followed by 2002 to 2011 (16%) and 2002 to 2007 (11.1%), which shows there is tendency that the level of credit rating decrease after financial crisis. One of the reasons could result from that credit rating agencies tend to rate firms more accurately and timely after financial crisis because of the regulatory enforcements and investors' criticisms to deal with the inaccuracy and delay in the designation of credit ratings to the firms. Another reason could be that firms may find themselves financially constraint after financial crisis as well as inability to access external funding to finance their investments, leading to decreases in their creditworthiness and their ability to service their external debts.

Table 3.11
Wilcoxon-Mann-Whitney Test for Investment Grade Firms and Speculative Grade Firms

Wilcoxon-Mann-Whitney Test between 2005 and 2011		
	Investment Grade Firms	Speculative Grade Firms
DEBTA	0.26	0.31
LDEBTA	0.20	0.24
MOW	0.00	0.00
EXT	0.27	0.37
GOV	3.00	4.50***
BOD	11.00	8.50***
IND	0.58	0.56
AUD	0.37	0.43*
AIN	1.00	1.00
CEO	1.00	1.00
SIZE	6.88	6.37***
ROA	0.07	0.08
TANG	0.30	0.50**
RD	0.00	0.00
HDT	0.00	-0.04***
IDT	0.04	0.06
RI	0.06	0.19
IMB	0.20	-0.37***
QCK	0.71	1.01**
INTST	5.56	4.47
Observations	121	23

Significantly different from the value for investment grade firms at 1% (***), 5% (**) and 10% (*) respectively.

(Table 3.11 continued)

Wilcoxon-Mann-Whitney Test between 2005 and 2007		
	Investment Grade Firms	Speculative Grade Firms
DEBTA	0.25	0.29
LDEBTA	0.20	0.15
MOW	0.00	0.54**
EXT	0.24	0.13
GOV	3.00	5.00***
BOD	11.00	7.00**
IND	0.55	0.57
AUD	0.39	0.43
AIN	1.00	1.00
CEO	1.00	1.00
SIZE	6.69	6.43
ROA	0.08	0.11
TANG	0.38	0.46*
RD	0.00	0.00
HDT	-0.01	-0.02
IDT	0.04	0.10
RI	0.10	0.23
IMB	0.21	0.41
QCK	0.73	2.02**
INTST	5.13	10.20
Observations	48	6
Wilcoxon-Mann-Whitney Test between 2008 and 2011		
	Investment Grade Firms	Speculative Grade Firms
DEBTA	0.26	0.31
LDEBTA	0.21	0.25
MOW	0.00	0.00
EXT	0.28	0.37
GOV	3.00	4.00**
BOD	11.00	9.00***
IND	0.62	0.56*
AUD	0.36	0.44*
AIN	1.00	1.00
CEO	1.00	1.00
SIZE	6.96	6.22***
ROA	0.06	0.06
TANG	0.26	0.53*
RD	0.00	0.00
HDT	0.01	-0.04***
IDT	0.05	0.06
RI	0.01	0.19
IMB	0.18	-0.50***
QCK	0.67	0.91
INTST	5.99	3.85
Observations	73	17

Significantly different from the value for investment grade firms at 1% (***), 5% (**) and 10% (*) respectively.

According to the corporate governance variables, I find that the corporate governance index of firms with speculative grade ratings tends to be significantly higher than investment grade firms, which implies that speculative grade firms are more likely to have higher corporate

governance quality than investment grade firms. As discussed earlier, firms that have lower corporate governance quality use external debt as a disciplinary mechanism to monitor and control the managerial consumption of perquisites, and therefore, one can explain that firms with low governance quality tend to acquire investment grade ratings and have access to the long-term bond market in order to mitigate the conflict of interest between managers and shareholders and reduce the agency costs. Previous studies argue that firms with investment grade ratings are perceived by external investors as more creditworthy firms and have lower cost of borrowing compared with speculative grade firms (Mizruchi and Stearns, 1994; Billet et al, 2007; Tang, 2009; Nakamoto, 2012; Naeem, 2012). In addition, as suggested by Rajan and Winton (1995), long-term public debts require less collateralizations, have less restrictive debt covenants and longer maturities than short-term bank loans. Therefore, firms would prefer investment grade bonds over speculative grade bonds and short-term bank loans as a corporate governance mechanism in order to reduce the agency costs. Nevertheless, the firms with speculative grade ratings do not have urgent needs to have access to the long-term debt as they tend to have better corporate governance quality, and hence, lower needs to use debt as an external corporate governance mechanism to reduce the agency costs.

In addition, I find that for the sample period of 2005 to 2008, investment grade firms tend to have lower levels of managerial ownership than speculative grade firms. Firms with higher level of managerial ownership are expected to have better corporate governance quality, as at high levels of managerial ownership, the interests between corporate managers and external shareholders are more likely to be aligned together, and managers are less likely to engage in the value decreasing activities and pursue their personal interests when they have high levels of managerial share ownership. However, I did not find existing negative relationship between

credit rating and managerial ownership for the sample periods of 2005 to 2011 and 2008 to 2011.

Furthermore, from the median comparison of corporate governance characteristics between investment grade firms and speculative grade firms, investment grade firms have larger board, smaller proportion of audit committee members on board, and however, larger proportion of independent non-executive directors on board. The differences in board size and audit committee independence between investment grade firms and speculative grade firms indicate that investment grade firms have lower governance quality than speculative grade firms, which is consistent with the prior evidences that investment grade firms tend to issue investment grade bonds to compensate the weak corporate governance quality. Nonetheless, the median difference in the fraction of independent non-executive directors shows that firms with investment grade firms have better corporate governance quality, whereas it is significant at 10% level and only for the sample period of 2008 to 2011, which is a relatively weaker significance level in comparison with other corporate governance characteristics.

The Wilcoxon-Mann-Whitney tests for the median comparison between investment grade and speculative grade firms and between rated and unrated firms provide concrete evidences that investment grade firms and rated firms are more likely to have weaker corporate governance quality than speculative grade firms and rated firms, which support the agency model that firms tend to use debt as a substitute for weak corporate governance quality in solving the conflict of interest between managers and shareholders.

In terms of the median differences in firm characteristics, the result show that the investment

grade firms are larger, have more tangible assets and higher industry-adjusted market to book ratio, and have lower liquidity ratio than the speculative grade firms, which implies that firms with investment grade ratings are larger and more able to service their debt with collaterals. The higher industry-adjusted market to book ratio indicates that investment grade firms are more likely to be overvalued. As firms tend to purchase more favourable credit ratings from credit rating agencies because most of the corporate credit ratings in the UK are solicited ratings, the investment grade ratings designated to the firms may not reflect the actual creditworthiness of firms and the investment grade firms tend to be "over rated", which leads to a higher market valuation and overvalued in the equity market. Moreover, the lower quick ratio may imply that investment grade firms are prone to issue corporate bonds to maintain their financial slack to invest in the future growth opportunities.

In the following sections, I will present the multivariate tests by using panel regression estimation technique to test whether there is a significant relationship between the capital structure and credit quality in the UK.

3.4.2.2 Multivariate Results

As there is an endogenous problem between capital structure and credit quality, that the firm's capital structure determines its credit quality, and its credit quality also determine its capital structure. Also, the capital structure of firms and corporate governance variables may have tendency to be interrelated with each other, as debt and corporate governance characteristics are often acts as substitute and either one of them would affect the another one in disciplining managerial discretion to the detriments of external investors. Moreover, as argued earlier, the shocks affecting the capital structure will also likely to affect the firm characteristics. As a

result, all the independent included in the regression should be treated as strictly endogenous. Therefore, in order to solve the endogeneity problem between dependent and independent variables, I implement two estimation methods as follows. First, all the independent variables are lagged by one year prior to the leverage ratios, including total debt ratio and long-term debt ratio respectively. Second, the time periods for dependent variables and independent variables are at the same year, and I use the dynamic panel data estimation technique, known as Arellano-Bond Generalized Method of Moments (GMM) estimation.

Table 3.12 shows the panel regression results for the relationship between capital structure and credit quality using total debt ratio as dependent variable. I determine whether to use fixed effects or random effects in the panel regressions by reporting the p-values of Hausman test in the results, if the p-value is significant, the test statistics suggests using fixed effects, if the p-value is insignificant, then the test statistics suggests using random effects. The variable CEO is not included in the analysis as the variation of CEO is extremely low, this may result from that CEO is not the chairman on board in the most of sample firms.

As can be seen in table 3.12, there is a positive association between total debt ratio and credit quality for the sample period of 2005 to 2011, which is statistically significant at 10% level. Specifically, firms with investment grade ratings tend to have 2.2% more total leverage than firms with speculative grade ratings over the period of 2005 to 2011. However, there is not any significant relationship between total debt ratio and credit quality for other sample periods of 2005 to 2007 and 2008 to 2011. Higher levels of credit rating benefit firms as firms with better credit ratings are able to raise external long-term debt at lower cost of borrowing, which results in a significant positive relationship between capital structure and credit quality.

Table 3.12
Regression Results for Effects of Credit Quality and Corporate Governance on Capital Structure with Total Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
RATING	0.017	0.022*	0.004	0.092	-0.003	0.012
	(0.192)	(0.099)	(0.960)	(0.302)	(0.539)	(0.446)
MOW	0.085	0.096	-0.050	0.075	0.008	0.023
	(0.459)	(0.380)	(0.706)	(0.598)	(0.728)	(0.834)
EXT	-0.007	-0.012	-0.059*	-0.075**	0.009	0.009
	(0.611)	(0.349)	(0.096)	(0.023)	(0.330)	(0.642)
GOV	0.001		-0.003		-0.001	
	(0.835)		(0.535)		(0.525)	
BOD		0.002*		0.003		0.002
		(0.098)		(0.409)		(0.173)
IND		-0.045*		-0.087*		-0.052
		(0.080)		(0.065)		(0.205)
AUD		-0.065***		-0.075**		-0.032
		(0.010)		(0.050)		(0.425)
AIN		0.013		-0.011		0.003
		(0.175)		(0.334)		(0.814)
SIZE	-0.021	-0.038	-0.020	0.003	-0.002	0.105**
	(0.456)	(0.172)	(0.514)	(0.920)	(0.546)	(0.029)
ROA	0.032	0.068	0.023	0.016	0.038	0.150
	(0.655)	(0.326)	(0.880)	(0.914)	(0.543)	(0.118)
TANG	-0.038	-0.052	-0.001	0.006	-0.005	-0.147
	(0.553)	(0.413)	(0.986)	(0.895)	(0.649)	(0.113)
RD	0.621***	0.535***	0.046	0.106	0.049	0.425
	(0.002)	(0.006)	(0.811)	(0.570)	(0.460)	(0.401)
HDT	0.133***	0.119**	0.102	0.067	-0.006	0.064
	(0.009)	(0.016)	(0.268)	(0.466)	(0.816)	(0.563)
IDT	0.754***	0.744***	0.845***	0.758***	0.990***	0.863***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.024**	-0.018	-0.052	-0.037	-0.020**	-0.021
	(0.034)	(0.103)	(0.212)	(0.365)	(0.028)	(0.086)
IMB	0.006*	0.006*	0.009	0.012*	0.002	0.007
	(0.100)	(0.087)	(0.174)	(0.081)	(0.303)	(0.198)
QCK	-0.015*	-0.013	0.002	0.009	-0.002	-0.009
	(0.095)	(0.141)	(0.913)	(0.573)	(0.781)	(0.483)
INTST	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001
	(0.346)	(0.116)	(0.560)	(0.456)	(0.167)	(0.116)
Constant	0.359*	0.438**	0.351	0.097	0.247***	0.980***
	(0.065)	(0.020)	(0.155)	(0.724)	(0.000)	(0.004)
Hausman	0.100*	0.015**	0.007***	0.828	0.114	0.000***
Effects	Fixed	Fixed	Fixed	Random	Random	Fixed
R^2	0.860	0.846	0.847	0.882	0.684	0.701
IG Firms	121	121	48	48	73	73
SG Firms	23	23	6	6	17	17
Obs.	144	144	54	54	90	90

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

Kisgen (2006) suggests that firms are concerned about their credit ratings because of discrete benefits and costs associated with credit rating levels. First, Kisgen (2006) points out several bond investment regulations are directly affected by the firms' credit ratings. Second, credit ratings determine whether certain investor groups such as banks, pension funds and insurance companies would invest in firms' bonds. Third, credit rating can act as a signal of firm's credit quality. Fourth, Kisgen (2006) argues credit ratings can also trigger corporate events that lead to changes in the discrete benefits and costs of credit ratings, such as change in coupon rate, loss of access to low cost bond market, and required repurchase of corporate bonds.

Besides, I find that substantial shareholding is negatively related to total debt ratio for the sample period of 2005 to 2007, which is significant at 5% level. Substantial shareholders is a corporate governance mechanism and often act as the safeguard of the interests of external small and medium shareholders, and firms with higher substantial shareholdings tend to have better corporate governance quality, and therefore, they have lower need to use debt as an external corporate governance mechanism in reducing the agency costs. During the sample period of 2005 to 2007, firms with 10% more substantial shareholdings tend to have 0.59% or 0.75% lower total debt ratio than their counterparts in model 3 and model 4 respectively. However, I did not find any significant relationship between capital structure and corporate governance index, and between capital structure and managerial ownership.

Having checked for the impact of the individual corporate governance characteristics, such as board size, fractions of independent non-executive directors and audit committee members on board, and audit committee independence, I find additional supports that firms with stronger governance quality tend to have lower total debt ratios. For instance, I find that board size is

positively related to total debt ratio, and fractions of independent non-executive directors and audit committee members on board are negatively related to total debt ratio. Additionally, I find that the effects of fractions of independent non-executive directors and audit committee members on total debt ratio are economically stronger for the sample period before the financial crisis than the whole sample period. For example, firms that have 10% more/less of the proportion of independent non-executive directors have 0.45% lower/higher total debt ratio than their counterparts for the whole sample period, and for the period before the financial crisis these firms tend to have 0.87% lower/higher total debt ratio. One possible explanation is that the effects of fractions of independent non-executive directors and audit committee members on total debt ratio are weakened during the financial crisis that decreases the economic significance for the whole sample period.

As the sharp decrease in credit supply since the financial crisis in 2008, firms that are highly dependent on bank loans find themselves financially contained while firms with bond market access may have greater access to external debt capital (Faulkender and Petersen, 2006), and therefore, bond market access plays a more vital role in external financing choices during the course of financial crisis (Michelsen and Klein, 2011). Firms with lower corporate governance quality are perceived by investors that have higher agency costs may not issue as much short-term and long-term debts as before the financial crisis leading to lower total leverage. Nevertheless, the leverage of firms with better corporate governance quality are not greatly affected by the contraction in short-term bank loans during the financial crisis, as they have lower agency costs than firms with lower governance quality, and therefore, they tend to issue long-term bonds to compensate for the contraction in bank loan supply to fully exploit their investment opportunities.

As regards to the firm characteristics, firms that are larger, have more growth opportunities and lower stock returns tend to have higher total debt ratio, over-levered and undervalued firms are also likely to have higher total debt ratio. As the coefficients on the deviation from target capital structure shown, the leverage difference between over-levered and under-levered firms tend to become smaller in the following year, which shows that firms with higher than historical or industry average total debt ratio tend to reduce their financial leverage and firms with lower than historical or industry average total debt ratio tend to increase their financial leverage as they have target capital structure in mind.

Table 3.13 presents the regression results using long-term debt ratio as dependent variable, and the results provide additional supports that firms with investment grade ratings tend to have more long-term debt ratio than firms with speculative grade ratings. Moreover, I find that the positive association between long-term debt ratio and credit quality is greater for the period before the financial crisis than the period during the financial crisis. For example, firms with investment grade ratings tend to have 51.6% more long-term debt ratio than speculative grade firms for the period before the financial crisis, and however, this difference in long-term leverage ratio between investment grade firms and speculative grade firms reduces to 5.7% during the financial crisis.

Table 3.13
Regression Results for Effects of Credit Quality and Corporate Governance on Capital Structure with Long-Term Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *LDEBTA*						
RATING	0.062*	0.037	0.516**	0.740***	0.057**	0.047
	(0.052)	(0.257)	(0.019)	(0.003)	(0.043)	(0.106)
MOW	0.190	0.042	-0.868**	-1.241***	-0.289**	-0.311**
	(0.489)	(0.874)	(0.020)	(0.002)	(0.033)	(0.038)
EXT	-0.009	-0.003	0.040	-0.017	-0.034	-0.036
	(0.775)	(0.929)	(0.686)	(0.856)	(0.397)	(0.366)
GOV	-0.001		0.011		-0.000	
	(0.885)		(0.446)		(0.970)	
BOD		-0.004		0.004		-0.003
		(0.201)		(0.620)		(0.481)
IND		0.080		-0.161		0.069
		(0.200)		(0.218)		(0.376)
AUD		0.055		-0.265**		-0.034
		(0.365)		(0.013)		(0.689)
AIN		0.028		-0.012		0.000
		(0.239)		(0.701)		(0.993)
SIZE	-0.022	-0.028	-0.010	0.060	-0.009	-0.003
	(0.750)	(0.678)	(0.901)	(0.511)	(0.722)	(0.909)
ROA	-0.266	-0.297*	-0.659	-0.732*	0.238	0.225
	(0.120)	(0.082)	(0.125)	(0.076)	(0.254)	(0.282)
TANG	0.249	0.238	-0.012	-0.002	0.175**	0.212***
	(0.110)	(0.128)	(0.917)	(0.985)	(0.018)	(0.007)
RD	0.635	0.651	-0.328	-0.188	0.375	0.246
	(0.176)	(0.160)	(0.539)	(0.718)	(0.421)	(0.634)
HDT	0.122	0.159	0.329	0.357	0.388***	0.352**
	(0.307)	(0.182)	(0.202)	(0.165)	(0.004)	(0.014)
IDT	0.123	0.037	0.941***	0.752***	0.744***	0.680***
	(0.371)	(0.787)	(0.000)	(0.001)	(0.000)	(0.000)
RI	-0.010	0.002	0.047	0.100	-0.034	-0.030
	(0.697)	(0.929)	(0.690)	(0.381)	(0.212)	(0.280)
IMB	-0.008	-0.007	0.016	0.022	-0.018**	-0.017*
	(0.345)	(0.415)	(0.399)	(0.230)	(0.032)	(0.057)
QCK	-0.044**	-0.058***	-0.046	-0.023	-0.035	-0.043
	(0.043)	(0.009)	(0.339)	(0.609)	(0.218)	(0.130)
INTST	0.000	0.000	0.003	0.003	-0.002*	-0.002*
	(0.624)	(0.607)	(0.276)	(0.249)	(0.098)	(0.081)
Constant	0.269	0.311	-0.268	-0.991	-0.326	-0.365
	(0.559)	(0.492)	(0.697)	(0.194)	(0.629)	(0.617)
Hausman	0.000***	0.000***	0.000***	0.013**	0.000***	0.154
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Random
R^2	0.849	0.826	0.870	0.895	0.883	0.880
IG Firms	121	121	48	48	73	73
SG Firms	23	23	6	6	17	17
Obs.	144	144	54	54	90	90

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

The reduced positive relationship between long-term debt ratio and credit quality is primarily driven by the different perceptions about the level of credit rating during the financial crisis. As the amount of bank lending contracted significantly, long-term public debt market plays a more important role during the financial crisis. As shown in table 3.13, investment grade firms are likely to reduce their long-term leverage during the financial crisis. Investment grade firms are more financially flexible, and however, they are more concerned about their credit ratings and often have target minimum of levels of credit rating, as the changes in their ratings could affect their benefits of having investment grade ratings, and their issuances of long-term corporate debts with lower costs of borrowing are conditional upon minimum level of credit ratings, for example, access to the commercial paper and Eurobond markets (Kisgen, 2007; Kisgen, 2009; Mittoo and Zhang, 2010). Therefore, investment grade firms work hard to maintain target minimum level of credit ratings and reduce their long-term debt ratio during the period of financial crisis.

On the contrary, speculative grade firms tend to increase their long-term debt ratio and issue high-yield bonds to enhance the financial flexibility and reduce the costs of financial distress, especially during the period of limited credit supply. As Michelsen and Klein (2011) suggest, long-term public debt market plays a more important role during the financial crisis, because long-term debt market offers an alternative source of external debt financing when it becomes very difficult to access the short-term bank loans. In addition, speculative grade bonds have several advantages over short-term bank loans, such as lower costs of borrowing, larger issue size, longer maturity, less restrictive debt covenants and less secured assets (Rajan and Winton, 1995; Gilson and Warner, 1997; Faulkender and Petersen, 2005). Therefore, it is argued that speculative grade firms tend to increase their issuance of long-term debt during the period of

financial crisis and compensate the reductions in short-term bank loans.

Moreover, I find that managerial ownership is negatively associated with long-term debt ratio for the periods before and during the financial crisis, which supports that firms with better corporate governance tend to have lower debt ratio. Nevertheless, the negative association between managerial ownership and long-term debt ratio is weakened during the financial crisis, as it becomes more difficult to raise external debt, I expect that firms with better governance are more able to raise debt than their counterparts during the financial crisis, which leads to a weakened relationship between managerial ownership and debt ratio. Also, I find a negative association between fraction of audit committee members on board and long-term debt ratio for the sample period of 2005 to 2007. However, I did not find that other corporate governance variables are significantly related to the long-term debt ratio.

Furthermore, I find that asset tangibility and deviation from target capital structure are positively related to long-term debt ratio, and profitability, industry-adjusted market to book ratio and quick ratio are negatively related to long-term debt ratio. Profitable firms tend to finance themselves with retained earnings rather than external financing, which results in a negative relation between profitability and long-term debt ratio.

3.4.2.3 Dynamic Model

Table 3.14 reports the test statistics using Arellano-Bond Generalized Method of Moments (GMM) estimation technique with total debt ratio as dependent variable. I conduct the GMM estimations for three sample periods, which are 2005 to 2011, 2005 to 2007 and 2008 to 2011, in order to check whether the effects of independent variables are different for the periods

before and during the financial crisis. Also, I report both of the corporate governance index and individual corporate governance characteristics in separate columns. All the variables in GMM estimations are in first differenced forms to eliminate time-invariant industry-specific effects, and time dummies are incorporated in all models. The panel data are in the forms of consecutive time-series. Further lags of lagged dependent variable and independent variables are used as the instruments, which make the endogenous variables predetermined and not correlated with the error terms. The first-order and second-order autocorrelations and Sargan test statistics are all reported after the estimation of the GMM models to ensure the validity of the results. I exclude the variable with limited evidences in affecting capital structure in the previous tables, such as profitability and industry adjusted market to book ratio. One of the potential limitations of the results is that the sample size for the rated firms are relatively small and most of the UK rated firms are investment grade firms, and thus the results should be interpreted accordingly with the awareness of this limitation.

First turning to the post estimation statistics including tests for autocorrelations and validity of the instruments across the models, the first and second-order autocorrelations from model 1 to model 4 show that the null hypothesis of serial correlation of residuals can not be rejected at any significance levels, the absence of first and second-order autocorrelations can be satisfied. Moreover, the Sargan test statistics introduced in the GMM estimations indicate that the instruments used in the models are valid and not correlated with the error terms. Nevertheless, although the Sargan test statistics of instrument validity are satisfied in model 5 and 6, the absence of second-order autocorrelation can not be satisfied as the p-values of second-order autocorrelation are statistically significant at 5% level, which shows that there might be potential misspecification of the models.

Table 3.14
GMM Results for Capital Structure and Credit Quality with Total Debt Ratio

Independent Variables	2005-2011	2005-2011	2005-2007	2005-2007	2008-2011	2008-2011
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: *DEBTA*						
$DEBTA_{i,t-1}$	0.446***	0.406***	-0.050	-0.123	0.847***	0.712***
	(0.001)	(0.006)	(0.875)	(0.423)	(0.000)	(0.000)
$RATING_{i,t}$	0.002	-0.001	0.032*	0.042***	-0.030***	-0.032**
	(0.918)	(0.977)	(0.084)	(0.001)	(0.006)	(0.017)
$RATING_{i,t-1}$	0.014	0.017	0.006	-0.020	0.027*	0.018
	(0.408)	(0.306)	(0.714)	(0.141)	(0.083)	(0.294)
$MOW_{i,t}$	-0.100*	-0.094*	-0.923	-1.243*	-0.119***	-0.123***
	(0.067)	(0.072)	(0.285)	(0.051)	(0.000)	(0.000)
$MOW_{i,t-1}$	0.144	0.128	-1.669***	-2.851***	0.103***	0.111**
	(0.153)	(0.190)	(0.007)	(0.000)	(0.003)	(0.017)
$EXT_{i,t}$	0.018	0.011	0.077**	0.094***	-0.022	-0.024*
	(0.290)	(0.499)	(0.018)	(0.008)	(0.189)	(0.078)
$EXT_{i,t-1}$	0.005	0.006	-0.056	-0.044**	0.008	0.002
	(0.791)	(0.730)	(0.193)	(0.035)	(0.630)	(0.913)
$GOV_{i,t}$	0.004*		-0.000		0.007**	
	(0.095)		(0.946)		(0.037)	
$GOV_{i,t-1}$	-0.008**		-0.000		-0.006	
	(0.041)		(0.937)		(0.141)	
$BOD_{i,t}$		-0.001		0.004***		0.002
		(0.286)		(0.005)		(0.147)
$BOD_{i,t-1}$		0.002		0.006***		0.001
		(0.227)		(0.000)		(0.503)
$IND_{i,t}$		0.022		0.077		0.024
		(0.394)		(0.172)		(0.499)
$IND_{i,t-1}$		-0.036*		0.098***		-0.025
		(0.055)		(0.006)		(0.368)
$AUD_{i,t}$		0.003		0.006		0.046
		(0.910)		(0.876)		(0.323)
$AUD_{i,t-1}$		0.015		0.020		-0.056
		(0.670)		(0.474)		(0.194)
$AIN_{i,t}$		0.008		0.001		0.018*
		(0.501)		(0.812)		(0.062)
$AIN_{i,t-1}$		0.016		0.002		-0.024***
		(0.151)		(0.750)		(0.009)
$SIZE_{i,t}$	-0.056***	-0.060***	-0.056***	-0.060***	-0.061***	-0.063***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.003)	(0.007)
$SIZE_{i,t-1}$	-0.044**	-0.048**	-0.012	-0.040	0.040**	0.033*
	(0.011)	(0.027)	(0.677)	(0.219)	(0.038)	(0.058)
$TANG_{i,t}$	0.077	0.086	0.066	0.386**	0.100*	0.065
	(0.334)	(0.307)	(0.771)	(0.024)	(0.082)	(0.434)
$TANG_{i,t-1}$	-0.078	-0.093	-0.561***	-0.414***	-0.049	-0.012
	(0.303)	(0.236)	(0.000)	(0.000)	(0.458)	(0.893)
$RD_{i,t}$	-0.036	-0.056	-0.116	-0.276***	0.326	0.118
	(0.620)	(0.511)	(0.174)	(0.000)	(0.576)	(0.780)
$RD_{i,t-1}$	0.107	0.015	0.368*	0.360*	-0.133	-0.006
	(0.366)	(0.923)	(0.064)	(0.084)	(0.818)	(0.987)
$HDT_{i,t}$	0.395***	0.380***	0.187	0.154***	0.414***	0.370***
	(0.001)	(0.005)	(0.156)	(0.009)	(0.000)	(0.002)
$HDT_{i,t-1}$	-0.125	-0.109	0.125	0.062	-0.270***	-0.251**
	(0.264)	(0.369)	(0.610)	(0.638)	(0.007)	(0.019)
$IDT_{i,t}$	0.450***	0.488***	0.445**	0.428***	0.516***	0.558***
	(0.001)	(0.001)	(0.014)	(0.000)	(0.000)	(0.000)
$IDT_{i,t-1}$	-0.271***	-0.275***	-0.176***	-0.169***	-0.440***	-0.299***
	(0.000)	(0.000)	(0.004)	(0.008)	(0.000)	(0.000)
$RI_{i,t}$	-0.022*	-0.021	-0.030**	-0.014	-0.021*	-0.027*
	(0.058)	(0.103)	(0.022)	(0.215)	(0.086)	(0.076)
$RI_{i,t-1}$	-0.014	-0.010	-0.028***	0.001	-0.013	-0.026
	(0.310)	(0.508)	(0.008)	(0.930)	(0.359)	(0.174)
$QCK_{i,t}$	-0.016	-0.014	0.000	-0.003	-0.028***	-0.024***
	(0.181)	(0.212)	(0.996)	(0.871)	(0.000)	(0.000)
$QCK_{i,t-1}$	-0.014***	-0.007	-0.029	-0.041**	0.015**	0.017***
	(0.100)	(0.439)	(0.307)	(0.042)	(0.022)	(0.000)
$INTST_{i,t}$	0.000	-0.000	-0.001*	-0.001**	0.000	0.000
	(0.799)	(0.858)	(0.056)	(0.028)	(0.422)	(0.506)
$INTST_{i,t-1}$	0.000	0.000	-0.000	-0.001**	0.001*	0.000***
	(0.217)	(0.346)	(0.498)	(0.014)	(0.065)	(0.004)
Constant	0.838***	0.858***	0.989***	0.824**	0.166***	0.235***
	(0.000)	(0.000)	(0.006)	(0.016)	(0.002)	(0.000)
Correlation 1	0.220	0.251	0.856	0.162	0.370	0.589
Correlation 2	0.638	0.673	0.832	0.261	0.044**	0.024**
Sargan Test	0.114	0.138	0.148	0.337	0.119	0.465

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Time effects are all accounted for via time-specific variables.

In table 3.14, having controlled for endogenous relationship between total debt ratio and all the independent variables, I find that the credit quality is positively related to total debt ratio in model 3 and 4 for the sample period before the financial crisis, and the credit quality is negatively related to total debt ratio for the period after the financial crisis. As shown in the results, firms with investment grade ratings are 3.2% or 4.2% more levered than firms with speculative grade ratings over the period of 2005 to 2007, which confirms that the better rated firms are more creditworthy firms, and they tend to have lower costs of external debt financing and lower costs of financial distress than lower rated firms, and hence they are able to undertake higher levels of financial leverage than firms with lower credit quality. On the contrary, firms with investment grade ratings are 3% or 3.2% less levered than firms with speculative grade ratings for the period of 2008 to 2011, when the global financial crisis is undergoing and profoundly reshaped the global capital markets.

Possible explanation for lower leverage of investment grade firms might be that investment grade firms have minimum target levels of credit ratings (Kisgen, 2007; Hovakimian et al, 2009; Kisgen, 2009), as their debt contracts are conditional upon minimum target level of credit rating, such as BBB- for investment grade rating. Due to the higher financial risks during the financial crisis, the creditors may demand even higher credit quality to have access to the long-term debt markets, one way to achieve higher credit quality is to reduce the amount of debt relative to equity issued (Kisgen, 2006), and therefore, firms with investment grade ratings tend to reduce their debt levels during the financial crisis. Moreover, I find a positive relationship between lagged credit quality and total debt ratio in model 5, which suggests that investment grade firms have 2.7% higher total leverage than speculative grade firms, and this is lower than the 3.2% of the coefficient in model 3 and provides additional

support that investment grade firms tend to reduce their financial leverage during the financial crisis.

On the other hand, speculative grade firms tend to become more levered than investment grade firms and increase their financial leverage during the financial crisis. Due to the limited supply of short-term bank loans and greater financial risks, from the distressed point of view, it is argued that firms with speculative grade ratings are likely to take the advantage of their credit ratings, and issue high-yield corporate bonds to enhance their financial positions and reduce the probability of bankruptcy.

The GMM estimates of corporate governance index show that firms with better corporate governance quality tend to become more levered for the sample period of 2005 to 2011 and 2008 to 2011. The positive coefficients on the corporate governance index suggest that firms with better corporate governance quality have lower agency costs of external financing that results in a higher total debt ratio (Brailsford et al, 2002; Florackis and Ozkan, 2009). The positive effect of corporate governance quality on total debt ratio is particularly stronger during the financial crisis, which indicates corporate governance quality is more important in explaining the capital structure of firms when financial risks increase. However, the lagged corporate governance have a negative influence on the total debt ratio as displayed in model 1, which is supported by the previous results that debt acts as an external corporate governance mechanism in reducing the agency costs when the firms have lower governance quality. Another explanation is that better corporate governance facilitates equity issuance as the reduction in agency costs (Mande et al, 2012). The overall results tend to be more supportive for the later finding.

The results exert a negative association between capital structure and managerial ownership. At high level of managerial ownership, the interests between managers and shareholders are better aligned and managers tend to be more responsible for their investment decisions, which would reduce the conflict of interests between managers and shareholders, and lower need to use debt to limit the managerial discretion. The economic significance shows that the impact of managerial ownership on capital structure is stronger for the period before the financial crisis than during the financial crisis, which implies that the entrenched managers at high level of managerial share ownership may become risk averse and tend to reduce the debt ratio as increased debt levels elevate the bankruptcy risks, whereas the firms with lower managerial ownership may not source as much external debt as the period before the credit crunch. However, the lagged managerial ownership is positively related to total debt ratio in model 5 and 6, it may implies that higher managerial ownership reduces the agency costs and firms are more able to borrow from the debt markets than firms with lower managerial ownership.

The coefficients on substantial shareholdings indicate firms with higher substantial shareholdings tend to have higher total debt ratio for the period of 2005 to 2007, as these firms are better governed and have lower agency costs, and therefore, they are able to sustain higher financial leverage than firms with lower substantial shareholdings. Nevertheless, over the period of 2008 to 2011, the relationship between debt ratio and substantial shareholdings become negative, which indicates that firms with higher substantial shareholdings are likely to reduce their financial leverage due to higher risks in capital markets, whereas firms with lower substantial shareholdings tend to increase their debt ratio to reduce their risks of agency conflicts and prevent managers engaging in value decreasing activities when the market risks

severely increase. However, the lagged substantial shareholdings have a negative impact on total debt ratio of firms during 2005 to 2007, which indicates that firms with higher substantial shareholdings have lower need to use debt as an external governance mechanism in reducing the agency costs.

The results present evidence that individual corporate governance characteristics influence total debt ratio. Specifically, I find that firms with larger board size and lower proportion of independent non-executive directors tend to have higher total debt ratio, which support that internal and external corporate governance mechanisms act as substitute of each other. Nevertheless, the result suggests a positive relationship between capital structure and fraction of independent non-executive directors, which indicates that firms with better corporate governance quality are able to sustain higher debt ratio.

In terms of the firm characteristics, I find that asset tangibility, and deviation from target capital structure are positively related to total debt ratio, and firm size, growth opportunities, stock return, quick ratio and interest coverage ratio are negatively related to total debt ratio. Firm size is an inverse proxy for information asymmetry, and therefore, larger firms may have preference in equity financing over debt that results in a lower debt ratio. Also, firms with higher growth opportunities that can not be used as collaterals tend to have lower debt ratio. Another explanation might be that due to underinvestment problem, firms with higher future growth potential tend to maintain lower debt ratio, as firms may pass up valuable investment opportunities when they undertake too much debt.

With regards to the lagged variables of firm characteristics, I find that growth opportunities

are positively related to total debt ratio, asset tangibility and deviation from target capital structure are negatively related to total debt ratio. Firm size, quick ratio and interest coverage ratio are positively related to total debt ratio before the financial crisis, and they are negatively related to total debt ratio during the financial crisis. From the perspective of costs of external financing, the positive effects of firm size, quick ratio and interest coverage ratio on total debt ratio indicate that larger firms, more liquid firms and firms that are able to service their debt financing are likely to have lower costs of borrowing and therefore, tend to be higher levered than their counterparts. On the contrary, these firms prefer to finance themselves with retained earnings or equity rather than debt, as increases in the debt may be associated with increased risk of bankruptcy during the financial crisis. Nevertheless, smaller firms, less liquid firms and firms with lower interest coverage ratio might be the firms with limited amount of retained earnings, and they tend to use their credit ratings to have access to the bond markets as they are less likely to borrow short-term bank loans when there is a significant contraction in bank lending during the financial crisis.

Table 3.15 presents GMM estimations for the relationship between capital structure and credit quality using long-term debt ratio as dependent variable instead of total debt ratio. The absence of the first and second-order autocorrelations can be satisfied for the sample periods of 2005 to 2011 and 2005 to 2007, but the null hypothesis of no serial correlations is rejected for the period of 2008 to 2011, indicating that there might be potential misspecification for the model 5 and 6. The Sargan test statistics show that the null hypothesis of the validity of instruments can not be rejected at any significance level across all the sample periods.

The empirical findings are in line with the view that credit quality is positively associated

with long-term debt ratio over the period of 2005 to 2011. Firms with investment grade ratings tend to have 7.6% or 7.5% more long-term debt ratio than firms with speculative grade ratings. Nonetheless, no further evidences are found for the periods of before and during the financial crisis in 2008.

I find that managerial ownership exerts a negative influence on long-term debt ratio for the period of 2005 to 2011, indicating that the incentive alignment effect between managers and shareholders at high level of managerial ownership alleviate the conflict of interests, which leads to a lower long-term debt ratio as debt act as a substitute of the internal governance mechanism. Moreover, the lagged managerial ownership has a positive effect on long-term debt ratio before the financial crisis, and it has a negative effect on long-term debt ratio during the financial crisis. The differences in the effects on leverage might imply that long-term debt financing is preferred by the firms with better governance quality before the financial crisis, and debt financing are avoided during the financial crisis because of the increased financial risks associated with debt and macroeconomic environment as well as increased costs of debt financing.

The coefficient estimates on substantial shareholdings are positive and significant for the periods of 2005 to 2011 and 2005 to 2007, which reveals that firms with better governance quality are able to have higher long-term debt ratio due to the reduction in agency costs. On the other hand, the negative coefficient on lagged substantial shareholdings indicate that firms with better governance quality tend to maintain lower long-term debt ratio during the period of financial crisis in order to prevent further increase in the costs of financial distress.

Table 3.15
GMM Results for Capital Structure and Credit Quality with Long-Term Debt Ratio

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *LDEBTA*						
$LDEBTA_{i,t-1}$	-0.768***	-0.764***	-0.861***	-0.888***	0.377***	0.348***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)
$RATING_{i,t}$	0.076***	0.075***	0.033	0.029	-0.002	0.007
	(0.000)	(0.001)	(0.556)	(0.637)	(0.973)	(0.824)
$RATING_{i,t-1}$	0.014	0.001	0.038	0.024	-0.033	-0.056
	(0.416)	(0.973)	(0.337)	(0.625)	(0.549)	(0.186)
$MOW_{i,t}$	-0.194	-0.232**	-3.245	-2.573	0.067	0.099
	(0.158)	(0.017)	(0.124)	(0.117)	(0.610)	(0.121)
$MOW_{i,t-1}$	0.665***	0.652***	8.221***	5.074**	-0.176	-0.259***
	(0.003)	(0.001)	(0.000)	(0.030)	(0.175)	(0.000)
$EXT_{i,t}$	0.171**	0.138***	0.186***	0.253***	0.005	-0.002
	(0.018)	(0.009)	(0.002)	(0.001)	(0.884)	(0.940)
$EXT_{i,t-1}$	-0.077	-0.040	-0.020	-0.039	-0.060*	-0.073**
	(0.137)	(0.151)	(0.765)	(0.565)	(0.072)	(0.011)
$GOV_{i,t}$	0.003		0.024		-0.007	
	(0.668)		(0.239)		(0.277)	
$GOV_{i,t-1}$	0.004		-0.001		0.005	
	(0.555)		(0.931)		(0.416)	
$BOD_{i,t}$		0.005		0.007*		0.004
		(0.354)		(0.068)		(0.108)
$BOD_{i,t-1}$		0.002		0.007		0.006*
		(0.614)		(0.405)		(0.066)
$IND_{i,t}$		0.075		-0.037		-0.038
		(0.162)		(0.885)		(0.252)
$IND_{i,t-1}$		-0.002		0.076		0.014
		(0.970)		(0.707)		(0.715)
$AUD_{i,t}$		-0.132		0.298**		-0.153***
		(0.266)		(0.020)		(0.001)
$AUD_{i,t-1}$		0.141		0.069		0.073
		(0.159)		(0.658)		(0.123)
$AIN_{i,t}$		-0.041		-0.035		-0.019
		(0.200)		(0.900)		(0.276)
$AIN_{i,t-1}$		0.055		-0.002		-0.019
		(0.256)		(0.960)		(0.377)
$SIZE_{i,t}$	0.243*	0.220*	0.346***	0.375***	-0.028	0.005
	(0.087)	(0.100)	(0.000)	(0.000)	(0.408)	(0.871)
$SIZE_{i,t-1}$	-0.255*	-0.321*	-0.377***	-0.454***	-0.007	-0.037
	(0.077)	(0.059)	(0.000)	(0.000)	(0.857)	(0.270)
$TANG_{i,t}$	-0.478***	-0.225	-0.483	-0.187	0.236*	0.348***
	(0.001)	(0.139)	(0.334)	(0.837)	(0.070)	(0.000)
$TANG_{i,t-1}$	-0.046	-0.193	-0.620	-0.145	-0.153	-0.273**
	(0.763)	(0.247)	(0.285)	(0.804)	(0.247)	(0.011)
$RD_{i,t}$	0.344**	0.233	0.807***	0.603*	0.399	1.160
	(0.014)	(0.182)	(0.001)	(0.054)	(0.683)	(0.385)
$RD_{i,t-1}$	0.719	-0.032	-0.835	0.071	-1.057	-1.421
	(0.101)	(0.948)	(0.298)	(0.949)	(0.372)	(0.456)
$HDT_{i,t}$	-0.155	-0.157	0.423***	0.459***	-0.153	-0.139
	(0.434)	(0.432)	(0.006)	(0.003)	(0.288)	(0.144)
$HDT_{i,t-1}$	0.605***	0.588**	0.659*	0.694***	0.036	0.037
	(0.010)	(0.023)	(0.070)	(0.010)	(0.752)	(0.681)
$IDT_{i,t}$	0.749***	0.772***	0.891***	0.760***	0.888***	0.922***
	(0.000)	(0.000)	(0.003)	(0.008)	(0.000)	(0.000)
$IDT_{i,t-1}$	0.043	-0.007	0.707***	0.529**	-0.227*	-0.205
	(0.820)	(0.974)	(0.001)	(0.032)	(0.078)	(0.181)
$RI_{i,t}$	-0.056*	-0.048*	-0.005	0.001	-0.062**	-0.093***
	(0.067)	(0.092)	(0.887)	(0.983)	(0.013)	(0.000)
$RI_{i,t-1}$	-0.049	-0.013	0.031	0.042	-0.013	-0.041
	(0.164)	(0.754)	(0.356)	(0.319)	(0.632)	(0.276)
$QCK_{i,t}$	0.060	0.071*	0.222***	0.202***	0.039**	0.054***
	(0.117)	(0.063)	(0.007)	(0.002)	(0.017)	(0.000)
$QCK_{i,t-1}$	-0.053	-0.062	-0.154**	-0.173**	-0.066***	-0.063***
	(0.270)	(0.187)	(0.041)	(0.023)	(0.001)	(0.001)
$INTST_{i,t}$	0.000	-0.000	0.002	0.002	0.002**	0.002***
	(0.572)	(0.867)	(0.179)	(0.124)	(0.024)	(0.001)
$INTST_{i,t-1}$	-0.000	-0.000	0.002**	0.003***	-0.000	-0.001
	(0.720)	(0.413)	(0.031)	(0.000)	(0.831)	(0.124)
Constant	0.462	1.045**	0.686	0.639	0.378***	0.458***
	(0.122)	(0.015)	(0.501)	(0.426)	(0.000)	(0.000)
Correlation 1	0.224	0.315	0.122	0.237	0.022**	0.022**
Correlation 2	0.752	0.566	0.525	0.341	0.098*	0.066*
Sargan Test	0.107	0.128	0.412	0.522	0.895	0.996

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Time effects are all accounted for via time-specific variables.

I find evidences that individual corporate governance characteristics influence the long-term debt ratio of firms. Specifically, there is a positive association between board size and long-term debt ratio, the effect of lagged board size on leverage is also positive. Interestingly, the fraction of audit committee members on board is positively associated with long-term debt ratio before the financial crisis, and a negative association during the financial crisis, which confirms that firms' preference of long-term debt financing when macroeconomic condition is not severely affected by the financial crisis.

3.4.3 Effect of High Level of Managerial Ownership on Capital Structure

Table 3.16 presents the regression results for the effect of high level of managerial ownership on capital structure, and high level of managerial ownership is indicated by the square of managerial share ownership. As discussed previously, the corporate governance variables are more likely to affect the total debt ratio rather than long-term debt ratio, and thus, I use total debt ratio as the dependent variable. In order to ensure the correct specification of the model, I also include credit rating variable ACS, which has been found to have positive and significant influence on firms' capital structure. However, as the total number of rated firms is only 16.5% of total sample firms, I include only the proxy for credit rating rather than credit quality to ensure a relatively large sample size.

The regression results confirm a positive and significant relationship between capital structure and credit rating. With regards to the variable of interest, I did not find an inverted U-shaped relationship between capital structure and managerial ownership for any sample period, which does not support for the inverted U-shaped relationship as previous literatures suggest (Brailsford et al, 2002; Florackis and Ozkan, 2009).

Table 3.16
Regression Results for Effect of High Level of Managerial Ownership on Capital Structure

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
ACS	0.008*	0.008*	-0.017	-0.018	-0.001	-0.002
	(0.065)	(0.073)	(0.186)	(0.172)	(0.934)	(0.739)
MOW	-0.015	-0.017	-0.065	-0.054	-0.024	-0.029
	(0.619)	(0.566)	(0.189)	(0.281)	(0.660)	(0.600)
MOWSQ	0.035	0.036	0.040	0.033	0.093	0.105
	(0.632)	(0.620)	(0.679)	(0.732)	(0.485)	(0.432)
EXT	-0.006	-0.005	-0.039***	-0.036**	0.014*	0.015*
	(0.347)	(0.426)	(0.004)	(0.011)	(0.086)	(0.088)
GOV	-0.002**		-0.000		-0.003**	
	(0.028)		(0.810)		(0.015)	
BOD		0.000		-0.000		0.002**
		(0.776)		(0.817)		(0.045)
IND		0.006		0.031*		0.011
		(0.483)		(0.063)		(0.370)
AUD		-0.000		-0.008		-0.017
		(0.957)		(0.655)		(0.207)
AIN		-0.008**		-0.006		-0.009*
		(0.012)		(0.299)		(0.084)
CEO		-0.013				-0.007
		(0.138)				(0.620)
SIZE	0.003	0.005	0.006	0.006	0.008	0.010
	(0.506)	(0.316)	(0.648)	(0.696)	(0.257)	(0.194)
TANG	0.004	0.006	-0.024	-0.025	0.035	0.036
	(0.767)	(0.665)	(0.334)	(0.312)	(0.110)	(0.106)
RD	0.062	0.055	0.674***	0.615***	-0.026	-0.028
	(0.211)	(0.269)	(0.001)	(0.005)	(0.631)	(0.618)
HDT	0.136***	0.137***	0.349***	0.351***	0.168***	0.172***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDT	0.847***	0.846***	0.655***	0.653***	0.795***	0.792***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.008**	-0.008**	-0.009	-0.009	-0.003	-0.002
	(0.013)	(0.013)	(0.375)	(0.348)	(0.327)	(0.416)
QCK	-0.007**	-0.006**	-0.001	-0.003	-0.008**	-0.007**
	(0.011)	(0.015)	(0.785)	(0.571)	(0.021)	(0.028)
INTST	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.001)	(0.002)	(0.007)	(0.010)
Constant	0.190***	0.187***	0.190**	0.189**	0.181***	0.167***
	(0.000)	(0.000)	(0.021)	(0.022)	(0.000)	(0.001)
Hausman	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.887	0.887	0.789	0.793	0.893	0.887
Obs.	916	916	386	386	530	530

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

Interestingly, the effect of substantial shareholdings on capital structure is negative before the financial crisis and positive after the financial crisis. The negative coefficient on substantial

shareholdings confirms that firms with better governance quality are likely to reduce the level of debt, as substantial shareholdings and debt are corporate governance mechanisms and are likely to act as substitute of each other in monitoring and controlling the managerial discretion and reducing the agency costs. Nevertheless, the supply of debt capital significantly reduced during the financial crisis, especially the short-term bank loans, firms compete to seek debt financing and it is expected that firms with higher level of substantial shareholdings tend to have better shareholder protection and lower agency costs, and they are more able to raise external debt during the financial crisis.

Moreover, the negative coefficients on corporate governance index support the substitution hypothesis that debt and corporate governance mechanisms act as substitute of one another, as in firms with better corporate governance quality, lower level of debt is required to limit the managerial consumption, and in firms with weaker corporate governance quality, higher level of debt is needed in reducing the agency costs.

The negative relationship between capital structure and corporate governance index is statistically significant for the sample periods of 2005 to 2011 and 2008 to 2011, and the economic significance is stronger for the period after the financial crisis. This negative relationship can be explained in two ways. First, firms with lower governance quality have greater incentives to use debt as an external corporate governance mechanism in order to monitor the managerial consumption of perquisite during the financial crisis, as it becomes more risky when managers engaging in value decreasing activates. On the other hand, firms with better governance quality tend to further reduce their debt financing due to the increased costs of debt. Second, as the difficulties in obtaining external funding during the financial

crisis, firms must establish a good reputation for not expropriating external shareholders and stable cash flows in order to gain their access to the external capital markets. Therefore, the need to build a good reputation is stronger for firms with lower governance quality. By taking more debt, firms compensate for the lower governance quality by transferring a credible signal to external investors for not expropriating the shareholders' wealth and also their ability to serve their debt interests through a predetermined timetable.

With regards to the individual corporate governance characteristics, I find board size and fraction of independent non-executive directors on board are positively related to debt ratio, and fraction of audit committee members on board is negatively related to debt ratio. The effect of fraction of audit committee member on board is stronger during the period of 2008 to 2011, which gives support to the stronger relationship between capital structure and corporate governance index during the financial crisis. The effect of fraction of independent non-executive directors show that firms with better corporate governance tend to be more levered, however, it is only significant at 10%, and majority of the results support firms with lower governance quality tend to be more levered, which is in line with the substitution hypothesis.

Furthermore, I find that growth opportunities and deviation from the target capital structure are positively related to debt ratio, and stock return, quick ratio and interest coverage ratio are negatively related to debt ratio, which is consistent with the prediction. Due to the problem of overinvestment, firms with higher growth opportunities tend to use more debt as disciplinary mechanism in order to avoid excessive non-profitable investment by the managers. Another explanation of positive relation between growth opportunities and capital structure is that

creditors recognize the firms with higher growth opportunities, leading to a higher debt ratio. The positive coefficient on the deviation from target capital structure support that firms have target capital structure and tend to adjust their financial leverage towards the target. The negative association between stock return and debt ratio confirms that firms with higher stock return prefer to finance themselves with equity rather than debt. The negative coefficients on quick ratio and interest coverage ratio suggest that firms with lower level of financial distress tend to finance their investment with retained earnings rather than external financing. Last but not least, the negative relation between quick ratio and capital structure is significant and stronger for the period of 2008 to 2011, which imply the tendency to avoid debt financing during the period of financial distress.

3.4.4 Effect of Managerial Ownership on Capital Structure and Substantial Shareholdings

Table 3.17 shows the effect of significant managerial ownership on the relationship between capital structure and substantial shareholdings, and the significant managerial ownership is measured by 20% or more of the managerial ownership within the sample firms. In the sample, the firms with presence of 20% or more of managerial ownership account for 7.9% of the total sample firms between 2005 and 2011, 8.2% between 2005 and 2007 and 7.7% between 2008 and 2011, which is a minority group in the sample and the majority of the sample firms does not have presence of high level of managerial ownership.

Table 3.17
Regression Results for Effect of Managerial Ownership (DML) on Relation between Capital Structure and Substantial Shareholdings

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
ACS	0.008*	0.008*	-0.015	-0.016	-0.001	-0.002
	(0.061)	(0.068)	(0.239)	(0.216)	(0.933)	(0.733)
MOW	-0.010	-0.013	-0.047	-0.039	0.005	0.003
	(0.654)	(0.551)	(0.235)	(0.332)	(0.897)	(0.938)
EXT	-0.004	-0.003	-0.036***	-0.033**	0.015*	0.015*
	(0.489)	(0.596)	(0.010)	(0.025)	(0.098)	(0.087)
DML	0.012	0.014	0.014	0.014	0.000	0.010
	(0.285)	(0.232)	(0.549)	(0.563)	(0.998)	(0.743)
*DML*EXT*	-0.023	-0.026	-0.033	-0.032	0.000	-0.014
	(0.329)	(0.282)	(0.472)	(0.504)	(0.997)	(0.775)
GOV	-0.002**		-0.000		-0.003**	
	(0.026)		(0.782)		(0.016)	
BOD		0.000		-0.000		0.002*
		(0.744)		(0.796)		(0.051)
IND		0.006		0.030*		0.010
		(0.516)		(0.071)		(0.394)
AUD		-0.000		-0.007		-0.016
		(0.990)		(0.702)		(0.240)
AIN		-0.008**		-0.006		-0.009*
		(0.011)		(0.272)		(0.089)
CEO		-0.013				-0.012
		(0.124)				(0.570)
SIZE	0.004	0.006	0.007	0.006	0.009	0.011
	(0.428)	(0.255)	(0.632)	(0.676)	(0.252)	(0.173)
TANG	0.003	0.005	-0.023	-0.024	0.037	0.038*
	(0.793)	(0.686)	(0.353)	(0.330)	(0.105)	(0.095)
RD	0.063	0.056	0.676***	0.613***	-0.026	-0.027
	(0.205)	(0.260)	(0.001)	(0.005)	(0.637)	(0.629)
HDT	0.137***	0.138***	0.350***	0.353***	0.168***	0.172***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDT	0.847***	0.845***	0.653***	0.651***	0.795***	0.792***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.008**	-0.008**	-0.008	-0.008	-0.003	-0.002
	(0.014)	(0.013)	(0.429)	(0.397)	(0.311)	(0.386)
QCK	-0.007**	-0.006**	-0.001	-0.003	-0.008**	-0.007**
	(0.011)	(0.015)	(0.813)	(0.606)	(0.022)	(0.032)
INTST	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.001)	(0.002)	(0.007)	(0.009)
Constant	0.185***	0.182***	0.186**	0.185**	0.179***	0.163***
	(0.000)	(0.000)	(0.024)	(0.025)	(0.000)	(0.001)
Hausman	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.887	0.887	0.791	0.795	0.893	0.888
Obs.	916	916	386	386	530	530

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

In the results, I did not find that high level of managerial ownership affects the relation between capital structure and substantial shareholding, which encourage me to use an alternative measure of high level of managerial ownership in table 3.18. The other results, including the effects of credit rating, corporate governance index, individual corporate governance characteristics, substantial shareholdings and firm characteristics are generally consistent with the previous findings.

Table 3.18 shows the effect of significant managerial ownership on the relationship between capital structure and substantial shareholdings, and the significant managerial ownership is measured by 10% or more of the managerial ownership within the sample firms. Having implemented an alternative measure of high level of managerial ownership, I find significant evidence that firms with presence of high level of managerial ownership weakened the positive relationship between substantial shareholdings and debt ratio, which is significant at 5% level for the sample period of 2008 to 2011. However, this relationship does not hold for the period before the financial crisis.

Managers tend to become entrenched at high level of managerial share ownership, and they have propensity to avoid monitoring from substantial shareholders. However, the coefficients on DMS show that managers tend to substitute debt for substantial shareholdings during the financial crisis, and the firms with presence of 10% or more of managerial ownership have 2.3% or 2.4% total debt ratio than their counterparts. In the sample, the firms with presence of 10% or more of managerial ownership account for 14.2% of the total sample firms for all the three sample periods, which is a minority group in the sample and 85.8% of the sample firms does not have presence of high level of managerial ownership.

Table 3.18
Regression Results for Effect of Managerial Ownership (DMS) on Relation between Capital Structure and Substantial Shareholdings

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
ACS	0.008*	0.008*	-0.017	-0.017	-0.000	-0.002
	(0.067)	(0.076)	(0.193)	(0.177)	(0.938)	(0.720)
MOW	0.030	0.034	-0.026	-0.011	-0.009	0.002
	(0.252)	(0.206)	(0.519)	(0.789)	(0.858)	(0.972)
EXT	-0.003	-0.002	-0.035**	-0.031**	0.022**	0.022**
	(0.621)	(0.800)	(0.016)	(0.037)	(0.017)	(0.015)
DMS	-0.004	-0.004	-0.000	-0.002	0.023*	0.024*
	(0.613)	(0.602)	(0.999)	(0.873)	(0.078)	(0.074)
*DMS*EXT*	-0.014	-0.017	-0.016	-0.016	-0.046**	-0.054**
	(0.342)	(0.236)	(0.544)	(0.556)	(0.045)	(0.027)
GOV	-0.002**		-0.000		-0.003**	
	(0.033)		(0.806)		(0.013)	
BOD		0.000		-0.000		0.001*
		(0.798)		(0.768)		(0.066)
IND		0.008		0.032*		0.011
		(0.366)		(0.057)		(0.377)
AUD		-0.001		-0.008		-0.017
		(0.949)		(0.667)		(0.218)
AIN		-0.008***		-0.006		-0.009*
		(0.007)		(0.253)		(0.091)
CEO		-0.013				-0.021
		(0.135)				(0.198)
SIZE	0.004	0.006	0.007	0.007	0.010	0.012***
	(0.384)	(0.208)	(0.598)	(0.637)	(0.176)	(0.100)
TANG	0.008	0.010	-0.023	-0.025	0.030	0.032
	(0.564)	(0.447)	(0.339)	(0.316)	(0.195)	(0.168)
RD	0.065	0.058	0.677***	0.613***	-0.023	-0.023
	(0.193)	(0.246)	(0.001)	(0.005)	(0.679)	(0.673)
HDT	0.139***	0.140***	0.351***	0.352***	0.171***	0.175***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDT	0.844***	0.843***	0.653***	0.650***	0.794***	0.789***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.007**	-0.007**	-0.007	-0.008	-0.003	-0.003
	(0.018)	(0.020)	(0.449)	(0.435)	(0.337)	(0.445)
QCK	-0.006**	-0.006**	-0.001	-0.003	-0.008**	-0.008**
	(0.016)	(0.022)	(0.800)	(0.587)	(0.013)	(0.017)
INTST	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.000**
	(0.000)	(0.000)	(0.001)	(0.002)	(0.010)	(0.012)
Constant	0.181***	0.176***	0.182**	0.180**	0.170***	0.162***
	(0.000)	(0.000)	(0.027)	(0.030)	(0.000)	(0.001)
Hausman	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.888	0.888	0.790	0.794	0.890	0.884
Obs.	916	916	386	386	530	530

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

One could explain that there are potential agency conflicts between managers and substantial shareholders. As argued by Florackis and Ozkan (2009), in the absence of monitoring from substantial shareholdings, managers are likely to voluntarily issue more debt in an attempt to increase the firm value by reducing the expected costs of agency conflict between managers and shareholders, and however, the agency costs as result from conflict of interests between managers and shareholders decrease when the overall corporate governance quality increases, and therefore, it is less likely that firms use debt as an external governance mechanism when the governance quality is good. This suggests a positive managerial behaviour when managers actively reduce the conflict of interests between managers and shareholders in the absence of monitoring from substantial shareholdings.

Alternatively, from a managerial entrenchment point of view, at high level of managerial ownership, managers are likely to be entrenched pursue their self-interests to the detriments of external shareholders, such as investing in non-profitable projects, consumption of perquisites and so on. As the main agency problem in the UK is the one between managers and external shareholders, entrenched managers have propensity to avoid the monitoring from substantial shareholders. During the financial crisis, taking more debt would significantly increase the bankruptcy risks, and shareholders are more interested in their dividend incomes and they are likely to prevent managers from taking too much debt. On the other hand, entrenched managers have incentives to reduce the monitoring from substantial shareholders and engage in the activities to serve their personal interests by taking excessive debt, especially when they are in financial distress, which significantly harm the interests of external shareholders.

3.4.5 Effect of Substantial Shareholdings on Capital Structure and Managerial Ownership

Table 3.19 shows the effect of significant substantial shareholdings on the relation between capital structure and managerial ownership, and the significant substantial shareholdings is measured by the presence of 10% or more of the substantial shareholdings within the sample firms. In the sample, the firms with presence of substantial shareholders with 10% or more of shares account for 54.4% of the total sample firms between 2005 and 2011, 53.6% between 2005 and 2007 and 55% between 2008 and 2011, which is a majority group in the sample. As there is a negative relationship between managerial ownership and capital structure, the results do not support that this negative relationship is weakened by substantial shareholdings. Also, the high level of substantial shareholdings do not seem to affect the capital structure of firms, although I find a positive relationship between substantial shareholding and capital structure. The results suggest that the capital structure of firms with high level of substantial shareholdings does not significantly different from their comparison group.

Table 3.19
Regression Results for Effect of Substantial Shareholdings on Relation between Capital Structure and Managerial Ownership

Independent Variables	2005-2011 (1)	2005-2011 (2)	2005-2007 (3)	2005-2007 (4)	2008-2011 (5)	2008-2011 (6)
Dependent Variable: *DEBTA*						
ACS	0.008*	0.008*	-0.018	-0.018	0.000	-0.001
	(0.063)	(0.069)	(0.169)	(0.159)	(0.956)	(0.865)
MOW	-0.002	-0.004	-0.056*	-0.047	0.008	0.006
	(0.909)	(0.839)	(0.059)	(0.117)	(0.824)	(0.864)
EXT	-0.007	-0.007	-0.026	-0.022	0.020**	0.019*
	(0.368)	(0.366)	(0.154)	(0.229)	(0.048)	(0.060)
DI	-0.003	-0.003	0.008	0.007	0.007	0.007
	(0.451)	(0.353)	(0.317)	(0.350)	(0.176)	(0.218)
*DI*MOW*	0.005	0.007	-0.026	-0.026	-0.016	-0.014
	(0.630)	(0.492)	(0.279)	(0.279)	(0.229)	(0.296)
GOV	-0.002**		-0.000		-0.003**	
	(0.031)		(0.801)		(0.020)	
BOD		0.000		-0.000		0.002*
		(0.742)		(0.800)		(0.059)
IND		0.006		0.031*		0.009
		(0.453)		(0.059)		(0.469)
AUD		-0.000		-0.009		-0.015
		(0.956)		(0.624)		(0.288)
AIN		-0.008**		-0.006		-0.009*
		(0.013)		(0.314)		(0.078)
CEO		-0.013				-0.005
		(0.132)				(0.714)
SIZE	0.004	0.006	0.005	0.004	0.008	0.009
	(0.475)	(0.286)	(0.738)	(0.779)	(0.286)	(0.215)
TANG	0.004	0.006	-0.023	-0.024	0.036*	0.037*
	(0.773)	(0.667)	(0.357)	(0.327)	(0.098)	(0.092)
RD	0.065	0.057	0.675***	0.617***	-0.033	-0.034
	(0.195)	(0.250)	(0.001)	(0.005)	(0.553)	(0.545)
HDT	0.137***	0.138***	0.348***	0.351***	0.164***	0.168***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDT	0.846***	0.845***	0.654***	0.651***	0.797***	0.794***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RI	-0.008**	-0.008**	-0.010	-0.010	-0.003	-0.003
	(0.014)	(0.014)	(0.317)	(0.301)	(0.264)	(0.332)
QCK	-0.007***	-0.006**	-0.001	-0.003	-0.008**	-0.008**
	(0.010)	(0.013)	(0.815)	(0.588)	(0.015)	(0.021)
INTST	-0.000***	-0.000***	-0.001***	-0.001***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.001)	(0.002)	(0.008)	(0.010)
Constant	0.189***	0.185***	0.197**	0.196**	0.181***	0.166***
	(0.000)	(0.000)	(0.017)	(0.018)	(0.000)	(0.001)
Hausman	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Effects	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
R^2	0.887	0.887	0.789	0.792	0.894	0.889
Obs.	916	916	386	386	530	530

The p-values are presented in parentheses. The coefficients are significant at 1% (***), 5% (**) and 10% (*) respectively. The regressions are pooled time-series cross-sectional regression or panel regression with random effects or fixed effects with robust standard errors (White, 1980) controlled for heteroscedasticity. The variance inflation factor does not show that there are problems of multicollinearity in the models. Industry effects and time effects are all accounted for via industry-specific and time-specific variables.

3.5 Conclusions and Recommendations

The main objective of this study is to investigate the effects of credit rating and corporate governance on capital structure of firms. This study contributes to the academic literatures in capital structure framework in the UK and provides findings that are distinct from previous studies. Especially, the positive association between capital structure and bond market access is predominantly driven by the positive relationship between long-term debt ratio and investment grade rating, this has not been documented in any prior studies. As can be seen, I find that firms with investment grade ratings tend to have approximately 8% or 20% more long-term debt ratio than unrated firms for the periods of 2005 to 2011 and 2005 to 2007 respectively, in comparison with that firms with credit ratings, either investment grade ratings or speculative grade ratings, have 0.8% more total debt ratio than unrated firms for the period of 2005 to 2011. The differences in the economic significance of results may due to two underlying reasons. First, credit rating provides firms with better access to the long-term debt market, it is more likely to affect the long-term debt ratio rather than total debt ratio. Second, rated firms have different levels of credit ratings, such as investment grade ratings and speculative grade ratings, and the effects of investment grade ratings and speculative grade ratings on financial leverage may potentially offset each other, which reduces the economic significance of the positive relationship between capital structure and credit rating.

The positive relationship between capital structure and credit rating may be explained by the increased supply side of external capital and lower cost of capital associated with corporate credit rating. Credit rating increases the supply side of available capital, which means that not only bank loans, but also it gives firms better access to the debt capital market. Besides, firms prefer long-term debts to short-term loans, as long-term debts have lower cost of borrowing,

larger size of issue and longer maturity than short-term loans. As van Binsbergen and Graham (2011) state, the decrease in the cost of borrowing of long-term debt is partly due to the reduced information asymmetry between managers and shareholders, because credit rating provides useful information to the investors regarding to the creditworthiness and default risk of firms and help investors make informed decisions.

Prior studies investigate the relationship between capital structure and bond market access for all sample firms, and the relationship between capital structure and credit quality for all rated firms separately. Nevertheless, they ignore an important point that firms with credit ratings comprise of better rated firms and lower rated firms, previous studies include rated firms and use unrated firms as a comparison group as a proxy for bond market access, which is problematic. As mentioned earlier, the effects of better ratings and lower ratings on capital structure may offset each other, which will make the relationship between capital structure and bond market access insignificant or ambiguous. To solve this problem, in addition to including rated firms and using unrated firms as a comparison group, future research should further investigate this relationship between capital structure and credit rating by including better rated firms and using unrated firms as a comparison group, and also, including lower rated firms and using unrated firms as a comparison group.

This study supports the hypothesis and generates new insights that investment grade rating and speculative grade rating offset each other in testing the relationship between capital structure and credit rating, which has not been documented in any of the previous studies. Specifically, I find evidences that investment grade firms tend to have higher long-term debt ratio than unrated firms, and speculative grade firms tend to have lower long-term debt ratio

than unrated firms. The majority of rated firms in the UK have investment grade ratings, and only 17.6% of rated firms in the sample of UK firms have speculative grade ratings, which implies that most of the rated firms in the UK are large and creditworthy firms. As a result, firms with speculative grade ratings can be easily screened out during the credit assessment process when creditors determine the creditworthiness of potential long-term debt issuers. Firms with speculative grade ratings are more risky in terms of their ability to service external debts and may incur significantly higher costs of borrowing than investment grade firms and unrated firms, and UK has more stringent creditor protection, speculative grade firms have higher risks of being liquidated by the creditors. Therefore, speculative grade firms tend to have significantly lower levels of long-term debt ratio than investment grade firms and unrated firms, instead, they are more likely to finance themselves with short-term bank loans or equity.

This study investigates the relationship between capital structure and credit quality. Obviously, I find that investment grade firms have higher financial leverage than speculative grade firms. More importantly, the results confirm that the long-term leverage difference between investment grade firms and speculative grade firms reduces during the financial crisis in comparison with the period before financial crisis, which is a new finding in this study. This empirical finding implies that investment grade firms reduced their long-term debt, while speculative grade firms increased their long-term leverage during the financial crisis, which may be explained by the difference perceptions about the levels of credit rating. Investment grade firms tend to have higher concern about their credit ratings, they often have minimum target levels of credit rating because their debt contracts are often conditional upon minimum levels of credit rating, for example, access to commercial papers and Eurobonds. Therefore,

when the global financial market is significantly affected by the financial crisis and financial risks become increasingly higher, creditors may demand more stringent terms in issuing long-term debts, investment grade firms tend to reduce their long-term leverage to ensure that their access to the bond market are not affected by the financial crisis.

On the other hand, speculative grade firms become increasingly distressed and their access to the short-term debt market are affected by the financial crisis due to significant reduction in the supply of short-term bank loans, and therefore, speculative grade firms may choose to issue long-term high-yield debts by utilizing their corporate credit ratings in order to compensate the reduction in short-term borrowings. This supports a distressed view that speculative grade firms tend to issue high-yield debts and increase their long-term debt ratio during the period of financial crisis. Although the announcement of speculative bond issue may lead to a negative shock in the share price, whereas the benefits of increased financial flexibility outweigh the costs of decreased share price.

With regards to the effect of corporate governance mechanisms on capital structure, by using corporate governance index as a proxy of corporate governance quality, I find that the overall corporate governance quality is negatively associated with total debt ratio, which implies that firms may substitute corporate governance for debt in monitoring and controlling managers in serving their own interests to the detriments of external shareholders. On the one hand, firms reduce their agency costs by substituting internal governance mechanisms and external debt as disciplinary mechanisms to limit managerial discretion. On the other hand, firms establish a good reputation for not expropriating shareholders by substituting governance mechanisms and debt. Moreover, I find that the economic significance of negative influence of corporate

governance index on leverage becomes greater during the financial crisis. As the costs of debt increased, firms with good corporate governance quality may reduce their financial leverage due to increased costs, and however, firms with weak governance quality tend to increase the reliance on debt in order to limit managerial consumption, when it becomes more risky for managers to engage in value decreasing activities during the financial crisis. This is the first UK study that uses corporate governance index as a proxy for overall governance quality, the corporate governance index incorporates individual corporate governance characteristics as an aggregate governance measure, we may interpret the overall governance quality of firms. Although the corporate governance characteristics complement each other in explaining the governance quality of firms, there might be a potential problem of ignoring the proportional effects of individual governance characteristics by using corporate governance index, and thus, I also test for the significance of individual governance characteristics in explaining capital structure of firms. In line with the effect of overall corporate governance quality on leverage, I find that firms with better individual corporate governance characteristics tend to have less leverage than their counterparts. Specifically, the results provide evidences that board size is positively related to debt ratio, and fractions of independent non-executive directors and audit committee members on board, and audit committee independence are negatively related to debt ratio.

Moreover, in consistent with the prediction, I find that managerial ownership and substantial shareholdings exert negative influences on capital structure of firms, which give supports that firms with better governance quality tend to have lower debt ratios. In addition, as the first study documents the effect of financial crisis on the relationship between capital structure and ownership structure, I find that the negative relationship between managerial ownership and

capital structure is weakened during the financial crisis, whereas the negative association between substantial shareholdings and capital structure is weakened significantly, and this association becomes positive during the financial crisis. As firms compete to gain their access to external debt due to reduction in the supply of debt capital, firms with better corporate governance tend to have lower agency costs and lower levels of financial distress, and hence, these firms are more able to raise external debt than the firms with weaker corporate governance, which results in a weakened relationship between capital structure and ownership structure.

Last but not least, this study generates new insight that managerial ownership is a corporate governance mechanism as well as an ownership feature that affects the effectiveness of substantial shareholdings in the UK. Specifically, the presence of high level of managerial ownership weakens the positive association between capital structure and substantial shareholdings during the financial crisis. As managers become more entrenched at high level of managerial ownership, the entrenched managers tend to avoid the monitoring from substantial shareholders in order to have more freedom to pursue their personal interests. Shareholders are interested in their dividend income and profit, whereas managers are interested in their benefits associated with managerial position, and therefore, the interests between managers and shareholders may deviate from each other. During the financial crisis, shareholders may have incentives to maintain the debt levels of firms and prevent managers from taking excessive debt. However, entrenched managers have incentives to maximize their benefits by investing in non-profitable projects and managerial consumption of perquisite, and they tend to reduce the level of monitoring from substantial shareholders, which would significantly harm the interests of external shareholders.

Chapter 4

Conclusions and Future Research

4.1 Conclusions

The main objective of this thesis is to examine the impact of market timing on corporate financing decisions and the effects of credit rating and corporate governance mechanism on capital structure. My research is motivated by the desire to further understand whether market timing, credit rating and corporate governance explain the capital structure of the UK firms, and to what extent the recent financial crisis affect our understanding of capital structure. For the purpose of the thesis, a number of hypotheses are developed and tested in two empirical chapters.

The first empirical chapter aims to investigate the relationship between security issuance and market timing factors based on a sample of UK public firms from 2005 to 2011. Specifically, I consider debt issues, equity issues and dual issues, and market timing factors include proxies for stock return, equity market valuation, information asymmetry, investment opportunities as well as credit rating, also, I include firm characteristics including profitability, asset tangibility, deviation from target capital structure, quick ratio and interest coverage ratio. The models are estimated by logistic regressions. Unlike the previous UK studies that simply use stock return and equity market valuation as proxies for market timing, I consider the effects of information asymmetry, investment opportunities and credit rating on security issuance decisions. Besides, I divide the whole sample period into two sub periods to examine whether the market timing effects change during the financial crisis, which is distinct from previous studies.

I find that firms are more likely to issue equity when they experience negative stock return and their equity are undervalued. Unlike the previous studies that firms issue equity when the market condition is good and when their equity are overvalued (Marsh, 1982; Lucas and McDonald, 1990; Baker and Wurgler, 2000; Jenter, 2005; Hovakimian, 2006; De Bie and De Haan, 2007), the results suggest that firms tend to issue equity under financial distress, which is in line with the prediction of pecking order theory. Moreover, I find that the effects of stock return and equity market valuation on equity issuance are more prominent during the financial crisis, which is consistent with the previous findings that firms tend to issue equity under financial duress.

Moreover, I contribute to the market timing literatures in the UK by examining the effect of information asymmetry on security issue decisions. By using both of firm size and corporate governance index as inverse proxies of information asymmetry, I provide evidences that firms with higher levels of information asymmetry have higher probability to conduct equity issues, which give supports to the pecking order theory that equity issuers tend to have higher levels of information costs. However, this is inconsistent with Mande et al (2012) that firms with better corporate governance quality have higher probability of equity issues when they use corporate governance index as an inverse proxy of agency costs. Furthermore, when I use individual corporate governance characteristics instead of corporate governance index, the results are consistent with my previous findings that firm with higher levels of information asymmetry are more likely to issue equity.

In addition, I find that investment opportunities have significant influences on corporate

financing decisions of firms. Specifically, the probabilities of debt versus equity issues and debt versus dual issues are positively related to investment opportunities, and the probability of dual versus equity issues are negatively related to investment opportunities, this is different from pecking order theory and suggests that equity may not be issued by firms under financial distress when no other external financing are available. The results imply that issue size may be an important consideration for firms while raising external capital, which has not been documented in any previous UK studies in market timing context. However, I did not find that corporate credit rating affect firms' security issuance decisions.

With regards to firm characteristics, I find that profitability and asset tangibility are negatively associated with probability of debt versus equity issues, which indicate that profitable firms and firms with higher level of tangible assets prefer to finance themselves with debt rather than equity. Moreover, I find that over-levered firms are more likely to issue equity and under-levered firms are more likely to issue debt, which is consistent with trade-off theory but inconsistent with pecking order theory. Therefore, the results provide a mixed supports of the classical trade-off theory and pecking order theory, both of the theories have some elements in explaining the capital structure of firms, and hence, it is best to treat the two capital structure theories as complements of each other.

The second empirical chapter examines the effects of credit rating and corporate governance on capital structure of UK firms over the period of 2005 to 2011. The empirical results are estimated by panel regressions. I use total debt ratio as dependent variable and long-term debt ratio as an alternative proxy for debt ratio, as credit ratings are more likely to affect long-term debt ratio rather than total debt ratio. I also incorporate two alternative measures of corporate

governance quality of firms that are corporate governance index and individual corporate governance characteristics. In order to control for the endogenous relationship between capital structure and independent variables, I lag the independent variables by one year, and I apply GMM estimation as an alternative estimation technique to control for endogeneity. I divide the whole sample period into two sub periods, which are before and during the financial crisis, to investigate whether financial crisis affect the empirical findings in this study.

Consistent with the prediction, I find that rated firms are more levered than unrated firms. More importantly, I contribute to previous studies by examining the interactions of investment grade ratings and speculative grade ratings in explaining the positive relationship between capital structure and credit rating. Specifically, I find that effects of investment grade ratings and speculative grade ratings on leverage offset each other, and investment grade firms have higher long-term leverage than unrated firms, while speculative grade firms have lower long-term leverage than unrated firms. I confirm that the positive relationship between capital structure and credit rating is mainly driven by the positive relationship between long-term leverage and investment grade ratings, and this is the first study that documents this important finding.

In addition, I provide empirical evidences that investment grade firms are more levered than speculative grade firms. Interestingly, this is the first study that finds the long-term leverage difference between investment grade firms and speculative grade firms reduces during the financial crisis. As creditor may demand stricter terms when financial markets are severely affected by financial crisis, investment grade firms tend to reduce their long-term leverage in order to maintain their minimum target levels of credit ratings, because their debt contracts

are often conditional upon minimum levels of credit ratings, such as commercial paper and Eurobond. On the other hand, speculative grade firms tend to increase their long-term leverage in order to enhance their financial flexibility and compensate for the reduction in short-term debt financing due to the limited supply of short-term bank loans during the financial crisis.

Moreover, this study contributes to academic literatures by investigating the effect of overall corporate governance quality, as proxied by corporate governance index, on capital structure of UK firms. I find consistent evidences that overall corporate governance quality is negative related to total debt ratio, which are statistically and economically significant. The results imply that firms substitute debt for weak corporate governance quality in monitoring and controlling managerial consumption and alleviating agency costs. Interestingly, I find that the negative relationship between overall corporate governance quality and total debt ratio tend to become stronger during the financial crisis, which reveals that firms with good governance quality tend to reduce their financial leverage due to increased costs of debt and costs of financial distress, while firms with weak governance quality tend to increase their financial leverage as an external governance mechanism in order to limit managerial discretion as it becomes more risky for managers to engage in value decreasing activities during the financial crisis. Having considered the individual corporate governance characteristics, the results are in line with the predictions that external debt and internal corporate governance mechanisms act as substitute of each other in reducing the agency costs.

Furthermore, I find that managerial ownership and substantial shareholdings are negatively related to capital structure of firms, which gives supports that firms with good governance

quality tend to maintain lower leverage. Nevertheless, contrary to the previous results, I find that the negative relationship between ownership structure and capital structure is weakened during the financial crisis, which suggests that ownership structure and corporate governance mechanisms play different roles during the financial crisis. Especially, as firms compete to seek external debt financing during the financial crisis, firms with better corporate governance are able to transfer a credible signal to external capital markets and they have lower agency costs, as a result, they may sustain higher leverage than firms with weak corporate governance quality.

A final but important comment, the presence of high levels of managerial ownership weakens the relationship between capital structure and substantial shareholdings during the financial crisis. The interests between managers and shareholders are more likely to be aligned together at low levels of managerial ownership, however, at high levels of managerial ownership, the entrenched managers have incentives to avoid the monitoring from substantial shareholders that leads to a weakened relationship between capital structure and substantial shareholdings.

My suggestion to the policy makers is that it is vital for the UK regulators to facilitate the accuracy and timeliness of credit rating, and promote more reliable information regarding to the creditworthiness of firms to help investors make informed decisions. Credit ratings are regarded as the independent and objective views of creditworthiness of firms, and however, most credit rating agencies are working with their clients such as financial institutions and corporate firms, as they are literally the paying clients who pay their fees before the issuance of credit ratings, this creates a conflict of interests and makes credit rating agencies more vulnerable to their paying clients. Therefore, policy makers should enforce regulations to ask

rating issuers pay their fees after the issuance of credit ratings rather than before the issuance of ratings. Moreover, at high levels of managerial ownership, managers are likely to pursue their own interests to the detriments of external shareholders, which should further the conflict of interests between managers and shareholders. Therefore, policy makers should promote better corporate governance practice and set out rules in the corporate governance code to prevent high levels of managerial ownership.

4.2 Limitation and Future Research

Although this study filled several gaps in the literatures on capital structure, however, it subjects to a few limitations that should be acknowledged. The definition of the equity issue and debt issue may include hybrid securities that have characteristics of both debt and equity, such as preferred stock and convertible debt that are dependent upon debt and equity respectively. A number of studies do not justify between hybrid securities (Hovakimian et al, 2001; Auotre and Kovas, 2010), while others argue that hybrid securities should be excluded in the analysis (Dittmar and Thakor, 2007; DeAngelo et al, 2010). It may be worthwhile to check whether the results including hybrid securities significantly different from the results excluding hybrid securities. Also, the methodology that is used to define equity issue and debt issue may not differentiate between initial public offerings and seasoned equity offerings, as Derrien and Kecskes (2007) point out, initial public offerings and seasoned equity offerings may be different in terms of market reaction and prior issue share price run-up, even though in the second dataset in Chapter 2 I address this issue.

The sample size might be another concern in this study. Unlike Hovakimian et al (2004) that the amount of dual issues is quite substantial in the US sample, the amount of dual issues in

the UK sample is quite limited, which prevent me to draw enough inferences on the dual issues. Future research could find ways to increase the sample size of dual issues and examine the effect of market timing on dual issues.

The corporate credit ratings are based on Standard and Poor's historical ratings only, however, there are other credit rating agencies that offer similar services to the firms, such as Moody's and Fitch Ratings. Therefore, the second study is limited to only the credit rating data from Standard and Poor's, and it might be interesting to compare the results using corporate credit ratings from other credit rating agencies. A further promising research is to investigate the determinants of corporate credit ratings that is different from the traditional approach using debt ratio as dependent variable. Future research could also examine the other markets, including the developing markets.

References

Abbott, L., Parker, S. and Peters, G. (2004) Audit committee characteristics and restatements. **Auditing: A Journal of Practice and Theory**, 23: 69-87

Aboody, D. and Lev, B. (2000) Information asymmetry, R&D, and insider gains. **Journal of Finance**, 55 (6): 2747-2766

Alti, A. (2006) How persistent is the impact of market timing on capital structure? **Journal of Finance**, 61 (4): 1681-1710

Acharya, V., Sundaram, R. and John, K. (2011) Cross-country variations in capital structures: The role of bankruptcy codes. **Journal of Financial Intermediation**, 20: 25-54

Anderson, R., Mansi, S. and Reeb, D. (2004) Board characteristics, accounting report integrity, and the cost of debt. **Journal of Accounting and Economics**, 37: 315-342

Antoniou, A., Zhao, H. and Zhou, Bilei (2009) Corporate debt issues and interest rate risk management: Hedging or market timing? **Journal of Financial Markets**, 12: 500-520

Arikawa, Y. (2008) The choice between public and private debt by Japanese firms. **Journal of International Economic Studies**, 22: 19-30

Arnold, G. (2008) **Corporate financial management**. 4th ed. Harlow: Financial Times Prentice Hall

Ashbaugh-Skaife, H., Collins, D. and LaFond, R. (2006) The effects of corporate governance on firms' credit ratings. **Journal of Accounting and Economics**, 42: 203-243

Asquith, P. and Mullins, D. (1986) Equity issues and offering dilution. **Journal of Financial Economics**, 15: 61-89

Autore, D. and Kovacs, T. (2010) Equity issues and temporal variation in information asymmetry. **Journal of Banking and Finance**, 34 (1): 12-23

Axelson, U., Stromberg, P. and Weisbach, M. (2009) Why are buyouts levered? the financial structure of private equity funds. **Journal of Finance**, 64 (4): 1549-1582

Baker, M. and Wurgler, J. (2000) The equity share in new issues and aggregate stock returns. **Journal of Finance**, 55 (5): 2219-2257

Baker, M. and Wurgler, J. (2002) Market timing and capital structure. **Journal of Finance**, 57 (1): 1-32

Baker, M., Greenwood, R. and Wurgler, J. (2003) The maturity of debt issues and predictable

variation in bond returns. **Journal of Financial Economics**, 70: 261-291

Baker, M., Ruback, R. and Wurgler, J. (2004) Behavioural corporate finance: a survey. **Working Paper Series**, 1-62

Bancel, F. and Mittoo, U. (2004) Cross-country determinants of capital structure choice: A survey of European firms. **Financial Management**, 33 (4): 103-132

Barberis, N. and Thaler, R. (2003) A survey of behavioural finance. **Handbook of the economics and finance**, 1052-1121

Barclay, M. and Smith, C. (2005) The capital structure puzzle: The evidence revisited. **Journal of Applied Corporate Finance**, 17 (1): 8-17

Barry, C., Mann, S., Mihov, V. and Ridriguez, M. (2008) Corporate debt issuance and the historical level of interest rates. **Financial Management**, 413-430

Barry, C., Mann, S., Mihov, V. and Ridriguez, M. (2009) Interest rate changes and the timing of debt issues. **Journal of Banking and Finance**, 33: 600-608

Batten, J., Fetherston, T. and Szilagyi, P. (2003) **European Fixed Income Markets: Money, Bond, and Interest Rate Derivatives**. West Sussex: John Wiley & Sons

Bayless, M. and Chaplinsky, S. (1996) Is there a window of opportunity for seasoned equity issuance. **Journal of Finance**, 51 (1): 253-278

Bebchuk, L., Cohen, A. and Ferrell, A. (2009) What matters in corporate governance? **Review of Financial Studies**, 22 (2): 783-827

Bebchuk, L., Cohen, A. and Wang, C. (2010) Learning and the disappearing association between governance and returns. **Journal of Financial Economics**, Forthcoming

Becker, B. and Milbourn, T. (2011) How did increased competition affect credit ratings? **Journal of Financial Economics**, 101: 493-514

Beckiris, F. (2013) Ownership structure and board structure: Are corporate governance mechanisms interrelated? **Corporate Governance**, 13 (4): 352-364

Belkhir, M. (2009) Board structure, ownership structure and firm performance: Evidence from banking. **Applied Financial Economics**, 19: 1581-1593

Ben-David, I., Graham, J. and Harvey, C. (2007) Managerial overconfidence and corporate policies. **Working Paper Series**, 1-49

Berger, P., Ofek, E. and Yermack, D. (1997) Managerial entrenchment and capital structure decisions. **Journal of Finance**, 52 (4): 1411-1438

Bharath, S., Pasquariello, P. and Wu, G. (2009) Does asymmetric information drive capital

structure decisions? **The Review of Financial Studies**, 22 (8): 3211-3243

Billett, M., King, T. and Mauer, D. (2007) Growth Opportunities and the Choice of Leverage, Debt Maturity, and Covenants. **Journal of Finance**, 62: 697-730

Blue Ribbon Committee (1999) Report and recommendations of the Blue Ribbon Committee on improving the effectiveness of corporate audit committees. **New York: New York Stock Exchange and National Association of Securities Dealers**

Bolton, P., Freixas, X. and Shapiro, J. (2012) The credit ratings game. **Journal of Finance**, 67 (1): 85-111

Bongaerts, D., Cremers, M. and Goetzmann, W. (2012) Tiebreaker: Certification and multiple credit ratings. **Journal of Finance**, 67 (1): 113-152

Booth, J., Cornett, M. and Tehranian, H. (2002) Board of directors, ownership, and regulation. **Journal of Banking and Finance**, 26 (10): 1973-1996

Boyd, B. (1994) Board control and CEO compensation. **Strategic Management Journal**, 15: 335-344

Brailsford, T., Oliver, B. and Pua, S. (2002) On the relation between ownership structure and capital structure. **Accounting and Finance**, 42: 1-26

Brealey, R. and Myers, S. (1996) **Principles of Corporate Finance**. New York: McGraw-Hill

Brounen, D., de Jong, A. and Koedijk, K. (2006) Capital structure policies in Europe: Survey evidence. **Journal of Banking and Finance**, 30: 1409-1442

Brown, L. and Caylor, M. (2006) Corporate governance and firm valuation. **Journal of Accounting and Public Policy, 25**: 409-434

Bruinshoofd, A. and De Haan, L. (2007) Market timing and corporate capital structure: A transatlantic comparison. **Working Paper Series**, 1-32

Burch, T., Christie, W. and Nanda, V. (2004) Do firms time equity offerings? Evidence from the 1930s and 1940s. **Financial Management**, 33 (1): 5-23

Butler, A., Grullon, G. and Weston, J. (2006) Can managers successfully time the maturity structure of their debt issues. **Journal of Finance**, 61 (4): 1731-1758

Byoun, S. (2008) How and when do firms adjust their capital structures toward targets? **Journal of Finance**, 63 (6): 3069-3096

Carhart, M. (1997) On persistence in mutual fund performance. **Journal of Finance**, 52 (1): 57-82

Celik, S. and Akarim, Y. (2013) Does market timing drive capital structure? Empirical

evidence from an emerging market. **International Journal of Economics and Financial Issues**, 3 (1): 140-152

Chae, J. (2005) Trading volume, information asymmetry, and timing information. **Journal of Finance**, 60 (1): 413-442

Chang, X., Dasgupta, S. and Hilary, G. (2006) Analyst coverage and financing decisions. **Journal of Finance**, 61 (6): 3009-3048

Chazi, A. and Tripathy, N. (2007) Which version of equity market timing affects capital structure? **Journal of Applied Finance**, 17: 70-81

Chen, J. (2004) Antecedents of capital structure of Chinese-listed companies. **Journal of Business Research**, 57: 1341-1351

Chen, W., Chung, H., Hsu, T. and Wu, S. (2010) External Financing Needs, Corporate Governance, and Firm Value. **Corporate Governance: An International Review**, 18 (3): 234-249

Cheng, L. (1995) Equity issue underperformance and the timing of security issues, **Working Paper Series**, Massachusetts Institute of Technology

Cheng, M. and Neamtiu, M. (2009) An empirical analysis of changes in credit rating properties: Timeliness, accuracy and volatility. **Journal of Accounting and Economics**, 47: 108-130

Choe, H., Masulis, R. and Nanda, V. (1993) Common stock offering across the business cycle: theory and evidence. **Journal of Empirical Finance**, 1: 3-31

Crosbie, P. and Bohn, J. (2003) **Modelling default risk: Modelling methodology**. Moody's KMV Company

De Bie, T. and De Haan, L. (2007) Market timing and capital structure: evidence for Dutch firms. **De Economist**, 155: 183-206

DeAngelo, H., DeAngelo, L. and Stulz, R. (2010) Seasoned equity offerings, market timing, and the corporate lifecycle. **Journal of Financial Economics**, 95: 275-295

Denis, D. (1994) Investment opportunities and the market reaction to equity offerings. **Journal of Financial and Quantitative Analysis**, 29 (2): 159-177

Denis, D. and Mihov, V. (2003) The choice among bank debt, non-bank private debt, and public debt: Evidence from new corporate borrowings. **Journal of Financial Economics**, 70: 3-28

Derrien, F. And Kecskes, A. (2007) The initial public offerings of listed firms. **Journal of Finance**, 62 (1): 447-480

Dierkens, N. (1991) Information asymmetry and equity issues. **Journal of Financial and Quantitative Analysis**. 26 (2): 181-199

Dissanaike, G., Faasse, J. and Jayasekera, R. (2014) What do equity issuances signal? A study of equity issuances in the UK before and during the financial crisis. **Journal of International Money and Finance**, Forthcoming

Dittmar, A. and Thakor, A. (2007) Why do firms issue equity. **Journal of Finance**, 62 (1): 1-54

Eckbo, B., Masulis, R. and Norli, O. (2000) Seasoned public offerings: resolution of the 'new issues puzzle'. **Journal of Financial Economics**, 56: 251-291

Elkhoury, M. (2008) Credit rating agencies and their potential impact on developing countries. **United Nation Conference on Trade and Development**, 186: 1-33

Elliott, W., Koeter-Kant, J. and Warr, R. (2008) Market timing and the debt-equity choice. **Journal of Financial Intermediation**, 17: 175-197

Fama, E. and French, K. (1993) Common risk factors in the returns on stocks and bonds. **Journal of Financial Economics**, 33 (1): 3-56

Fama, E. and French, K. (2002) Testing trade-off and pecking order predictions about dividends and debt. **The Review of Financial Studies**, 15 (1): 1-33

Fama, E. and French, K. (2005) Financing decisions: who issues stock? **Journal of Financial Economics**, 76: 549-582

Faulkender, M. and Petersen, M. (2005) Does the source of capital affect capital structure? **The Review of Financial Studies**, 19 (1): 45-79

Faulkender, M., Flannery, M., Hankins, K. and Smith, J. (2012) Cash flows and leverage adjustment. **Journal of Financial Economics**, 103: 632-646

Faux, Z. and Shenn, J. (2011) **When credit ratings lose their meaning** [online]. Bloomberg Businessweek. Available from http://www.businessweek.com/magazine/when-credit-ratings-lose-their-meaning-08312011.html [Assessed 1st September 2011]

Fauzi, F. and Locke, S. (2012) Board structure, ownership structure and firm performance: A study of New Zealand listed firms. **Asian Academy of Management Journal of Accounting and Finance**, 8 (2): 43-67

Firth, M. (1995) The impact of institutional stockholders and managerial interests on capital structures of firms. **Managerial and Decision Economics**, 16 (2): 167-175

Florackis, C. and Ozkan, A. (2009) Managerial incentives and corporate leverage: Evidence from the United Kingdom. **Journal of Accounting and Finance**, 1-23

Frank, M. and Goyal, V. (2003) Testing the pecking order theory of capital structure. **Journal of Financial Economics**, 67: 217-248

Frank, M. and Goyal, V. (2009) Capital structure decisions: which factors are reliably important? **Financial Management**, 38: 1-37

Franks, J., Mayer, C. and Renneboog, L. (2001) Who disciplines management in poorly performing companies? **Journal of Financial Intermediation**, 10: 209-248

Friend, K. and Lang, K. (1998) An empirical test of the impact of managerial self interest on corporate capital structure. **Journal of Finance**, 43: 271-281

Fu, D. and Liu, X. (2004) An analysis on model of board structure and its efficiency. **Journal of Chongqing Jianzhu University**, 26 (3): 121-125

Gatchev, V., Spindt, P. and Tarhan, V. (2009) How do firms finance their investment? the relative importance of equity issuance and debt contracting costs. **Journal of Corporate Finance**, 15: 179-195

Gaud, P., Jani, E., Hoesli, M. and Bender, A. (2005) The capital structure of Swiss companies: an empirical analysis using dynamic panel data. **European Financial Management**, 11: 51-69

Gilson, S. and Warner, J. (1997) Junk bonds, bank debt, and financial flexibility. Working paper, Harvard Business School

Goergen, S., Renneboog, L. and Zhang, C. (2008) Does UK institutional shareholders monitor their investee firms. **Tilburg University Centre for Economic Research**, 38: 1-21

Gompers, P., Ishii, J. and Metrick, A. (2003) Corporate governance and equity prices. **Quarterly Journal of Economics**, 118 (1): 107-155

Graham and Harvey (2001) The theory and practice of corporate finance: evidence from the field. **Journal of Financial Economics**, 60: 187-243

Guney, Y. and Iqbal-Hussain, H. (2010) Capital structure and IPO market timing in the UK. **Working Paper Series**, 1-34

Guttler, A. (2011) Lead-lag relationships and rating convergence among credit rating agencies. **Journal of Credit Risk**, 7 (1): 95-119

Hermalin, B. and Weisbach, M. (1991) The effect of board composition and direct incentives on firm performance. **Financial Management**, 20 (4): 101-112

Hoaglin, D., Iglewiez, B. and Tukey, J. (1986) Performance of some resistant rules for outlier labelling. **Journal of American Statistical Association**, 81: 991-999

Hovakimian, A., Opler, T. and Titman, S. (2001) The debt-equity choice. **Journal of Financial and Quantitative Analysis**, 36 (1): 1-24

Hovakimian, A., Hovakimian, G. and Tehranian, H. (2004) Determinants of target capital structure: the case of dual debt and equity issues. **Journal of Financial Economics**, 71: 517-540

Hovakimian, A. (2006) Are observed capital structures determined by equity market timing. **Journal of Financial and Quantitative Analysis**, 41 (1): 221-243

Hovakimian, A. and Li, G. (2008) Proxies for target leverage and capital structure research. **Working Paper Series**, 1-36

Hovakimian, A., Kayhan, A. and Titman, S. (2009) Credit rating targets. **Social Science Research Network**, 1-34

Huang, R., Marquardt, C. and Zhang, B. (2011) Why do managers avoid EPS dilution? **Working Paper Series**, 1-49

Huang, I. (2014) Does market timing persistently affect capital structure? Evidence from stock market liberalization. **Pacific-Basin Finance Journal**, 26: 123-144

Hull, J. (2009) The credit crunch of 2007: What went wrong? Why? What lessons can be learned? **Journal of Credit Risk**, 5 (2): 3-18

Huyghebaert, N. and Wang, L. (2012) Expropriation of minority investors in Chinese listed firms: The role of internal and external corporate governance mechanisms. **Corporate Governance: An International Review**, 20 (3): 308-332

Iqbal-Hussain, H. (2011) Capital structure and market timing in the UK: Deviation from target leverage and security issue choice. **Working Paper Series**, 1-31

Jarrow, R. and Xu, L. (2010) Credit rating accuracy and incentives. **Journal of Credit Risk**, 6 (3): 133-151

Jensen, M. and Meckling, W. (1976) Theory of the firm: Managerial behaviour, agency costs and ownership structure. **Journal of Financial Economics**, 3: 305-360

Jensen, M. (1986) Agency costs of free cash flow, corporate finance, and takeovers. **American Economic Review**, 76 (2): 323-329

Jensen, M. (1993) The modern industrial revolution, exit and the failure of internal control systems. **Journal of Finance**, 48: 831-880

Jenter, D. (2005) Market timing and managerial portfolio decisions. **Journal of Finance**, 60 (4): 1903-1949

Jenter, D., Lewellen, K. and Warner, J. (2011) Security issue timing: what do managers know

and when do they know it? **Journal of Finance**, 66 (2): 413-443

Jiraporn, P. and Ning, Y. (2006) Dividend policy, shareholder rights, and corporate governance. **Journal of Applied Finance**, 16 (2): 24-36

Jiraporn, P. and Gleason, K. (2007) Capital structure, shareholder rights, and corporate governance. **Journal of Financial Research**, 30 (1): 21-33

Jiraporn, P., Kim, J., Kim, Y. and Kitsabunnarat, P. (2012) Capital structure and corporate governance quality: Evidence from the Institutional Shareholder Services. **International Review of Economics and Finance**, 22 (1): 208-221

Judge, A. and Mateus, C. (2009) The effect of access to public debt markets on capital structure. **Work in Progress**, 1-43

Judge, A. and Korzhenitskaya, A. (2011) Credit market conditions and impact of access to the public debt market on corporate leverage. **Work in Progress**, 1-53

Judge, G., Hill, R., Griffiths, W., Lutkepohl, H. and Lee, T. (1988) **Introduction to the theory and practice of econometrics**. 2nd Edition. New York: Wiley

Jung, K., Kim, Y. and Stulz, R. (1996) Timing, investment opportunities, managerial discretion, and the security issue decision. **Journal of Financial Economics**, 42: 159-185

Kayhan, A. and Titman, S. (2007) Firms' histories and their capital structures. **Journal of Financial Economics**, 83: 1-32

Kim, W. and Weisbach, M. (2008) Motivations for public equity offers: an international perspective. **Journal of Financial Economics**, 87: 281-307

Kisgen, D. (2006) Credit ratings and capital structure. **Journal of Finance**, 61 (3): 1035-1072

Kisgen, D. (2007) The influence of credit ratings on corporate capital structure decisions. **Journal of Applied Corporate Finance**, 19 (3): 65-73

Kisgen, D. (2009) Do firms target credit rating or leverage levels? **Journal of Financial and Quantitative Analysis**, 44 (6): 1323-1344

Kisgen, D. (2012) The real and financial effects of credit ratings: Evidence from Moody's adjustment. **Social Science Research Network**, 1-40

Kole, S. and Lehn, K. (1997) Deregulation, the evolution of corporate governance structure and survival. **American Economic Review**, 87 (2): 421-425

Korajczyk, R., Lucas, D. and McDonald, R. (1991) The effect of information releases on the pricing and timing of equity issues. **The Review of Financial Studies**, 4 (4): 685-708

Korajczyk, R., Lucas, D. and McDonald, R. (1992) Equity issues with time varying

asymmetric information. **Journal of Financial and Quantitative Analysis**, 27 (3): 397-417

Korajczyk, R. and Levy, A. (2003) Capital structure choice: Macroeconomic conditions and financial constraints. **Journal of Financial Economics** 68, 75-109

Kraus, A. and Litzenberger, R. (1973) A state-preference model of optimal financial leverage. **Journal of Finance**. 28 (4): 911-922

Krishnaswami, S. and Subramaniam, V. (1999) Information asymmetry, valuation, and the corporate spin-off decision. **Journal of Financial Economics**, 53: 73-112

Krishnaswami, S., Spindt, S. and Subramaniam, V. (1999) Information asymmetry, monitoring and the placement structure of corporate debt. **Journal of Financial Economics**, 51: 407-434

Lang, L., Ofek, E. and Stulz, R. (1996) Leverage, investment, and firm growth. **Journal of Financial Economics**, 40: 3-29

Lasfer, M. (1995) Agency costs, taxes and debt: The UK evidence. **European Financial Management**, 1 (3): 265-285

Leary, M. and Roberts, M. (2005) Do firms rebalance their capital structures? **Journal of Finance**, 60 (6): 2575-2618

Leary, M. (2009) Bank loan supply, lender choice, and corporate capital structure. **Journal of Finance**, 64 (3): 1143-1185

Leary, M. and Roberts, M. (2010) The pecking order, debt capacity, and information asymmetry. **Journal of Financial Economics**, 95: 332-355

Lee, I. (1997) Do firms knowingly sell overvalued equity? **Journal of Finance**, 52 (4): 1439-1466

Levis, M. (1993) The long run performance of initial public offerings: the UK experience 1980-1988. **Financial Management**, 22 (1): 28-41

Lipton, L. and Lorsch, J. (1992) A modest proposal for improved corporate governance. **The Business Lawyer**, 48: 59-77

Loughran, T. and Ritter, J. (1995) The new issues puzzle. **Journal of Finance**, 50 (1): 23-51

Loughran, T. and Ritter, J. (1997) The operating performance of firms conducting seasoned equity offerings. **Journal of Finance**, 52 (5): 1823-1850

Loughran, T., Ritter, J. and Rydqvist, K. (1994) Initial public offerings: international insights. **Pacific-Basin Finance Journal**, 2: 165-199

Lucas, D. and McDonald, R. (1990) Equity issues and stock price dynamics. **Journal of**

Finance, 45: 1019-1043

Lyandres, E. (2010) Target leverage and the costs of issuing seasoned equity. **Finance Research Letters**, 7 (1): 39-52

Mahajan, A. and Tartaroglu, S. (2008) Equity market timing and capital structure: international evidence. **Journal of Banking and Finance**, 32: 754-766

Mallin, C. (2001) Institutional investors and voting practices: An international comparision. **Corporate Governance**, 9 (2): 118-126

Mallin, C. (2004) **Corporate governance**. New York: Oxford University Press

Mallin, C. (2005) The financial sector and corporate governance: the UK case. **Corporate Governance**, 13 (4): 532-541

Mallin, C. (2008) Institutional shareholders: Their role in the shaping of corporate governance. **International Journal of Corporate Governance**, 1 (1): 97-105

Mallin, C. (2012) Institutional investors: The vote as a tool of governance. **Journal of Management Governance**, 16: 177-196

Mande, V., Park, Y. and Son, M. (2012) Equity or debt financing: Does good corporate governance matter? **Corporate Governance: An International Review**, 20 (2): 195-211

Marsh, P. (1982) The choice between equity and debt: an empirical study. **Journal of Finance**, 37 (1): 121-144

Martin, J. and Titman, S. (2008) Single vs. multiple discount rate: How to limit "influence costs" in the capital allocation process. **Journal of Applied Corporate Finance**, 20 (2): 79-83

Masulis, R. and Korwar, A. (1986) Seasoned equity offerings: an empirical investigation. **Journal of Financial Economics**, 15 (1): 91-118

McConnell, J. and Servaes, H. (1995) Equity ownership and two faces of debt. **Journal of Financial Economics**, 39: 131-157

McLean, R. (2011) Share issuance and cash savings. **Journal of Financial Economics**, 99: 693-715

Michelsen, M. and Klein, C. (2011) The relevance of external credit ratings in the capital structure decision-making process. **Social Science Research Network**, 1-53

Mittoo, U. and Zhang, Z. (2010) Bond market access, credit quality, and capital structure: Canadian evidence. **The Financial Review**, 45: 579-602

Mizruchi, M. and Stearns, L. (1994) A Longitudinal Study of Borrowing by Large American

Corporations. **Administrative Science Quarterly**, 39:118-140

Modigliani, F., and Miller, M.H. (1958) 'The cost of capital, corporate finance and the theory of investment'. American Economic Review 48, pp. 261-297

Modigliani, F. and Miller, M.H. (1963) 'Corporate income taxes and the cost of capital: A correction'. American Economic Review 53, pp. 433-443

Monks, R. and Minow, N. (1995) **Corporate governance**. New York: Blackwell Publishing

Morellec, E. and Schurhoff, N. (2011) Corporate investment and financing under asymmetric information. **Journal of Financial Economics**, 99: 262-288

Myers, S. (1977) Determinants of corporate borrowing. **Journal of Financial Economics**, 5: 147-175

Myers, S. (1984) The capital structure puzzle. **Journal of Finance**, 39 (3): 575-592

Myers, S. and Majluf, N. (1984) Corporate financing and investment decisions when firms have information that investors do not have. **Journal of Financial Economics**, 13 (2): 187-221

Naeem, S. (2012) Financial Structure of UK Firms: The Influence of Credit Ratings. Unpublished PhD Thesis. University of Glasgow

Nakamoto, M. (2012) **Nomura avoids second quarterly losses** [online]. Financial Times. Available from http://www.ft.com [Assessed 1st February 2011]

O'Brien, T., Klein, L. and Hilliard, J. (2007) Capital structure swaps and shareholder wealth. **European Financial Management**, 13 (5): 979-997

Oswald, D. and Young, S. (2004) What role taxes and regulation? A second look at open market share buyback activity in the UK. **Journal of Business Finance and Accounting**, 31: 257-292

Ozkan, A. (2001) Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data. **Journal of Business Finance and Accounting**, 28 (1) & (2): 175-198

Ozkan, A. and Ozkan, N. (2004) Corporate cash holdings: an empirical investigation of UK companies. **Journal of Banking and Finance**, 28: 2103-2134

Rajan, R. and Winton, A. (1995) Covenants and collateral as incentives to monitor. **Journal of Finance**, 50 (4): 1113-1146

Rajan, R. and Zingales, L. (1995) What do we know about capital structure? Some evidence from international data. **Journal of Finance**, 50 (5): 1421-1460

Rau, P. and Vermaelen, T. (2002) Regulation, taxes and share repurchases in the UK. **Journal of Business**, 75: 245-282

Rayton, B. and Cheng, S. (2004) Corporate governance in the United Kingdom: Changes to the regulatory template and company practice from 1998 to 2002. **Working Paper Series**, 1-47

Renders, A., Gaeremynck, A. and Sercu, P. (2010) Corporate governance ratings and company performance: A cross-European study. **Corporate Governance: An International Review**, 18 (2): 87-106

Shen, C., Huang, Y. and Hasan, I. (2012) Asymmetric benchmarking in bank credit rating. **Journal of International Financial Markets, Institutions and Money**, 22 (1): 171-193

Shleifer, A. and Vishny, R. (1986) Large shareholders and corporate control. **Journal of Political Economy,** 94: 461-488

Shleifer, A. and Vishny, R. (2003) Stock market driven acquisitions. **Journal of Financial Economics**, 70: 295-312

Short, H.; Keasey, K. and Duxbury, D. (2002) Capital structure, managerial ownership and large external shareholders: a UK analysis. **International Journal of the Economics of Business**, 9 (3): 375-399

Shyam-Sunder, L. and Myers, S. (1999) Testing static tradeoff against pecking order models of capital structure. **Journal of Financial Economics**, 51: 219-244

Spiess, D. and Affleck-Graves, J. (1995) Underperformance in long-run stock returns following seasoned equity offerings. **Journal of Financial Economics**, 38 (3): 243-267

Stowell, D. (2010) **An introduction to investment banks, hedge funds, and private equity: The new paradigm**. London: Academic Press

Sufi, A. (2009) The real effects of debt certification: Evidence from the introduction of bank loan ratings. **Review of Financial Studies**, 22 (4): 1659-1691

Tang, T. (2009) Information asymmetry and firms' credit market access: Evidence from Moody's credit rating format refinement. **Journal of Financial Economics**, 93: 325-351

Titman, S. and Wessels, R. (1988) The determinants of capital structure choice. **Journal of Finance**, 43 (1): 1-19

Tukey, J. (1977) **Explanatory data analysis**. Reading, MA: Addison-Wesley

Van Binsbergen, J. and Graham, J. (2011) An empirical model of optimal capital structure. **Journal of Applied Corporate Finance**, 23 (4): 34-59

Van Duyn, A. and Bullock, N. (2009) **Debt and equity issues pick up pace** [online].

Financial Times. Available from http://www.ft.com [Assessed 3rd September 2009]

Welch, I. (2004) Capital structure and stock returns. **Journal of Political Economy**, 112 (1): 106-131

White, H. (1980) A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. **Econometrica**, 48: 817-838

Wolkenfeld, S. (1998) CFAR: A new tool for predicting credit quality. **Journal of Applied Corporate Finance**, 11(1): 120-125